

# **Yamhill County Multi-Jurisdictional Hazard Mitigation Plan Update**

October 2014  
Prepared by Oregon Partnership for Disaster Resilience

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### List of Acronyms and Abbreviations

ALF	Animal Liberation Front
CDC	United States Center for Disease Control
CFR	Code of Federal Regulations
Cfs	Cubic feet per second
CR2K	State of Oregon Fire Marshal's Community Right to Know
CRS	Community Rating System
DHS	Department of Homeland Security
DMA 2000	Disaster Mitigation Act of 2000
ELF	Earth Liberation Front
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FY	Fiscal year
GIS	Geographic Information System
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HS	Hazardous Substances
M	Magnitude
MHMP	Multi-Jurisdictional Hazard Mitigation Plan
MM	Modified Mercalli Intensity Scale
Mph	Miles per hour
NFIA	National Flood Insurance Act
NHMP	Natural Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NGO	Non-governmental organizations
NID	National Inventory of Dams
ODF	Oregon Department of Forestry
ODOT	Oregon Department of Transportation
OSFM	Oregon State Fire Marshal's Office
PDM	Pre-Disaster Mitigation
PGA	Peak ground acceleration
RFC	Repetitive Flood Claims
RL	Repetitive Loss
SFHA	Special Flood Hazard Area
SR	State Road
SRL	Severe Repetitive Loss
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
URS	URS Corporation
USC	United States Code
USGS	United States Geological Survey

# 1 INTRODUCTION

This section provides a brief introduction to hazard mitigation planning, local mitigation plan requirements, the grants associated with these requirements, and a description of this Multi-Jurisdictional Hazard Mitigation Plan (MHMP).

## 1.1 HAZARD MITIGATION PLANNING DEFINED

The Federal Emergency Management Agency (FEMA) defines mitigation as, “sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.”<sup>1</sup> Said another way, natural hazard mitigation is a method of permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of the “Whole Community” - individuals, private businesses and industries, state and local governments, and the federal government.

Engaging in mitigation activities provides jurisdictions with a number of benefits, including:

- Reduced loss of life, property, essential services, critical facilities and economic hardship;
- Reduced short-term and long-term recovery and reconstruction costs;
- Increased cooperation and communication within the community through the planning process; and
- Increased potential for state and federal funding for recovery and reconstruction projects.

## 1.2 PLANNING REQUIREMENTS

### 1.2.1 Local Mitigation Plans

Yamhill County and its jurisdictions developed this Natural Hazards Mitigation Plan (NHMP) in an effort to reduce future loss of life and damage to property resulting from natural hazards. It is impossible to predict exactly when natural hazard events will occur, or the extent to which they will affect community assets. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K) and the regulations contained in 44 CFR 201 require that jurisdictions maintain an approved NHMP in order to maintain eligibility for

<sup>1</sup> Local Mitigation Planning Handbook, March 2013, [http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema\\_local\\_mitigation\\_handbook.pdf](http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf)

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federal hazard mitigation assistance (HMA) funds. DMA2K reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. State and local jurisdictions must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Thus, local and federal approval of this plan will ensure that Yamhill County and listed cities remain eligible for pre- and post-disaster mitigation project and planning grants.

Pursuant to Chapter 44 Code of Federal Regulations (CFR), section 201.6, the NHMP planning processes shall include opportunity for the public to comment on the plan during review. In addition, the updated NHMP shall include documentation of the public planning process used to develop the plan. The NHMP update must also contain a risk assessment, mitigation strategy and a plan maintenance process. Lastly, the Natural Hazard Mitigation Plan must be submitted to the Oregon Military Department's Office of Emergency Management for initial plan review, and then to FEMA for federal review and approval. FEMA will issue a final approval once the plan is formally adopted at the local level by all participating jurisdictions.

The July 17, 2014 FEMA crosswalk, which documents compliance with 44 CFR, is provided in Appendix B.

### 1.2.2 Oregon's Natural Hazards Policy Framework

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the jurisdiction's Comprehensive Plan, and helps each jurisdiction meet the requirements of statewide land use planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Oregon Military Department's Office of Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

### 1.3 GRANT PROGRAMS REQUIRING HAZARD MITIGATION PLANS

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from

future disaster damages. These programs include the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA). All three FEMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State or Local Mitigation Plan. The HMGP is a state-level competitive grant program that is tied directly to a specific presidentially declared disaster. The PDM and FMA programs although competitive, rely on specific pre-disaster grant funding sources authorized by congress. For current information about HMA administration, refer to the program guidance provided by FEMA. A summary of the specific grant programs follows.

### 1.3.1 Disaster Funded Mitigation Assistance

**Hazard Mitigation Grant Program:** Provides grants to States, Tribes, and local entities to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. The program may provide a State or Tribe with up to 20 percent of the total disaster grants awarded by FEMA. The cost-share for this grant is 75 percent Federal/25 percent non-Federal.

### 1.3.2 Hazard Mitigation Assistance Programs

**Pre-Disaster Mitigation Program:** Provides funds to State, Tribes, and local entities, including public universities, for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM project's potential savings must be more than the cost of implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The total amount of PDM funding available is appropriated by Congress on an annual basis. The cost-share for this grant is 75 percent Federal/25 percent non-Federal.

**Flood Mitigation Assistance Grant Program:** As noted above, the goal of the FMA grant program is to reduce or eliminate flood insurance claims under the NFIP. Particular emphasis for this program is placed on mitigating repetitive loss (RL) properties (*Repetitive loss properties: A property for which two or more NFIP losses of at least \$1,000 each have been paid within any 10 year period since 1978*). The primary source of funding for this program is the National Flood Insurance Fund. Grant funding is available for three types of grants, including Planning, Project, and Technical Assistance. Project grants, which use the majority of the program's total funding, are awarded to States, Tribes, and local entities to apply mitigation measures to reduce flood losses to

properties insured under the NFIP. The cost-share for this grant is 75 percent Federal/25 percent non-Federal. However, 90 percent Federal/10 percent non-Federal to mitigate SRL properties (defined below) is available in certain situations.

### 1.4 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DESCRIPTION

The remainder of this NHMP consists of the following sections and appendices:

**Prerequisites** - This section addresses the prerequisites of plan adoption, which include adoption by the governing body of each participating jurisdiction, including Yamhill County and the cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina and Yamhill. Adoption resolutions for each jurisdiction are included in Appendix C.

**Community Description** - Provides a general history and background of the communities and unincorporated areas of Yamhill County, including historical trends for population and the demographic and economic conditions that have shaped the area. Trends in land use and development are also discussed (Figure A-1).

**Planning Process** - Describes the planning process and identifies Steering Committee members who assisted in the formation of the hazard mitigation planning process, the meetings held as part of the planning process (Appendix D), and key stakeholders within the county and surrounding region. In addition, this section documents public outreach activities (Appendix E) and the review and incorporation of relevant plans, reports, and other appropriate information.

**Hazard Analysis** - Describes the process used by the Steering Committees to identify, screen, and select the 16 hazards to be profiled in this version of the NHMP. The hazard analysis includes the nature, history, location, extent, and probability of future events for each hazard. In addition, historical and location hazard figures are included in Appendix A.

**Vulnerability Analysis** - Identifies potentially vulnerable assets - people, residential and nonresidential buildings, dwelling units, RL properties, critical facilities, and critical infrastructure - in the incorporated cities and unincorporated areas of the county. These data were compiled by assessing the potential impacts from each hazard using Geographic Information System (GIS) and community provided information. The resulting information identifies the full range of hazards that the incorporated cities and unincorporated areas of the county could face potential impacts, damages, and (where data was available) economic losses.

**Mitigation Strategy** - Provides a blueprint for reducing the potential losses identified in the vulnerability analysis. The Steering Committees developed a list of mitigation goals and potential actions to address the risks facing Yamhill County and the nine incorporated cities. Mitigation actions include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities. In addition, mitigation strategies are developed for continued compliance with the NFIP and the reduction of flood damage to flood-prone structures, including any RL property. The Steering Committees selected relevant mitigation actions and strategies to implement county-wide.



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County and city-specific mitigation strategies, including capability assessments, are provided in Section 7.

**Plan Maintenance** - This section describes the Steering Committee's formal plan maintenance process to ensure that the NHMP remains an active and applicable document. The process includes monitoring, evaluating, and updating the NHMP; implementation through existing planning mechanisms; and continued public involvement (community specific appendices). Suggested Plan Maintenance documents are located in Appendix G.

**References** - Lists the reference materials used to prepare this NHMP.

**Appendices:**

Appendix A includes the figures that identify known hazard areas, previous hazard occurrences, and critical assets.

Appendix B provides the FEMA crosswalk, which documents compliance with 44 CFR for both the Local Mitigation Plan requirements.

Appendix C provides the adoption resolutions for Yamhill County and the cities of Amity, Carlton, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina and Yamhill City.

Appendix D contains the Steering Committee's meeting agendas and handouts.

Appendix E provides public outreach information, including press releases, information posted on Yamhill County's and participating jurisdiction's websites, and public workshop material.

Appendix F contains the Benefit-Cost Analysis Fact Sheet used to select and prioritize mitigation actions.

Appendix G provides the plan maintenance documents, such as an annual review sheet and the progress report form.

Appendix H provides information about the 2006 and 2009 planning processes.

### 1.5 ADOPTION BY LOCAL GOVERNING BODIES AND SUPPORTING DOCUMENTATION

The requirements for the adoption of this NHMP by the participating local governing bodies, as stipulated in the DMA 2000 and its implementing regulations, are described below.

#### DMA 2000 REQUIREMENTS: PLAN ADOPTION

##### Multi-Jurisdictional Plan Adoption

**Requirement §201.6(c)(5):** For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

**Requirement §201.6(c)(5):** The plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council).

##### Element

- E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval?
- E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption?

Source: FEMA, March 2013.

Yamhill County and the cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina and Yamhill are the jurisdictions represented in this NHMP and meet the requirements of Section 322 of the DMA 2000.

The local governing body of Yamhill County and the cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina and Yamhill have adopted the NHMP by resolution. A scanned copy of each resolution is included in Appendix C.

## 2 COMMUNITY DESCRIPTION

This section describes the location, geography, and history; demographics; and land use development trends of Yamhill County and the cities of Amity, Carlton, Dayton, Dundee, Lafayette, McMinnville, Newberg, Sheridan, Willamina and Yamhill. Although the cities of Carlton and McMinnville have not updated in this NHMP update process, their community descriptions have been included because they comprise a considerable portion of the county's population.

### 2.1 LOCATION, GEOGRAPHY, AND HISTORY

Encompassing approximately 718 square miles, Yamhill County is located in the northwest of Oregon's Willamette Valley. The county is bordered to the west by the Willamette River and lies east of the Coast Range and west of the Cascade Mountains. The county's watersheds shape the landscape with the Yamhill River as the major watershed with dozens of tributaries creating sub-basins. Yamhill's landscape is dominated by gently sloping lowlands and forested uplands. The county is at the center of Oregon's wine industry with over 140 wineries and 230 vineyards. Yamhill County's primary industries include agricultural production, timber, manufacturing and healthcare. Yamhill County, thought to be named for the historic Yamhill Indians (now part of the Confederated Tribes of the Grand Ronde), was created in 1843, first as a district, and then in 1847 was made a county seat based in Lafayette. The county government later moved to McMinnville where it resides today. The area has been inhabited for over 8,000 years and the establishment of the Oregon Trail led significant migration to the area.

### 2.2 DEMOGRAPHICS

#### 2.2.1 Yamhill County

The population of Yamhill County increased by over 19 percent between 2000 and 2013 from 84,992 to 101,400 residents, accounting for 2.6 percent of Oregon's total population (PSU 2014). The largest cities by population are McMinnville (32,510), Newberg (22,580), and Sheridan (6,180). In 2012, there were 37,056 housing units with 16.7 percent being multi-unit structures. Median housing values increased from \$146,200 in 2000 to \$235,300 in 2012. Renters occupied 10,282 units in 2012 and median rent was \$854. (U.S. Census 2006, 2012). The unemployment rate in 2014 is: **TBAxxx**.

Historically, Yamhill County's economy was primarily based on agriculture and silviculture. The region's dependence on natural resources industries has shifted to include viticulture and its corresponding increase in tourism. Growth in the high tech and other manufacturing industries has helped to offset declines in traditional resources industries. Nearly 20 percent of Yamhill County's workforce commutes to the Portland metro area for work, which underscores the importance of functional transportation infrastructure to the County's economy (OED 2014). Manufacturing is still the single largest economic sector in the county. More detailed statistical data can be found in the jurisdictional addenda in Section 7 of this document.

### 2.3 LAND USE AND DEVELOPMENT TRENDS

Yamhill County is a mix of residential, parks and recreation, commercial, industrial, and agricultural land uses. In 2014, more than 98.9 percent of land was zoned for agricultural or forest use. The northeast section of the county is seeing the most growth. Land use planning in Yamhill County intends to control sprawl and costs associated with providing public facilities and services, and create an orderly growth pattern within the existing urban areas (Yamhill County Comprehensive Land Use Plan 1996).

The timber industry provides employment and wood products and is also the number one commodity exporter in the county. Nearly half the land use in the county is designated as commercial forestry. In addition, forestlands provide watersheds areas for cities, habitat for fish and wildlife, and recreational opportunities. Several sensitive wildlife habitat areas exist in the county that supports upland game, furbearers, anadromous and warm water fish, water fowl, and a variety of non-game species. (Yamhill County Comprehensive Land Use Plan 1996)

Additionally, the 2013 Yamhill County Economic Development Plan (YCEDP) indicates that a lack of available industrially-zoned land and poor infrastructure negatively impact business in the County. The YCEDP suggests that communities reconsider rezoning or enhancing available land to increase its appeal for business owners. Another option mentioned in the YCEDP is expansion of urban growth boundaries. It will be important for the county to consider potential natural hazards in these redevelopment and expansion areas as it pursues its economic development agenda.

Through regulation and legislation, the county seeks to control housing types, location, density and costs (Yamhill County Comprehensive Land Use Plan 1996). Building codes in effect at the time of the 2014 plan update are as follows: 2010 Oregon Structural Specialty Code, 2011 Oregon Residential Specialty Code, 2011 National Electrical Code, and the 2011 Oregon Plumbing Specialty Code.

### 3 PLANNING PROCESS

This section provides an overview of the planning process; identifies the Steering Committee members and key stakeholders; documents public outreach efforts; and summarizes the review and incorporation of existing plans, studies, and reports used to develop this NHMP. Additional information regarding the Steering Committee and public outreach efforts is provided in Appendices D and E.

The requirements for the planning process, as stipulated in DMA 2000 and its implementing regulations, are described below.

#### DMA 2000 Requirements: Planning Process

##### Planning Process

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### Element

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### Documentation of the Planning Process

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### Element

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

##### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

##### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

##### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The 2009 Yamhill County Multi-Jurisdictional Hazard Mitigation Plan described the natural and technological hazards, critical facilities, and resulting mitigation goals and actions for county-owned facilities as well as all of its incorporated jurisdictions except for the city of McMinnville. This document reviews and

updates the 2009 Yamhill County NHMP with a focus on natural hazards. As updated, the plan includes the Cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina, and Yamhill City in a single document. Information on technological hazards can be found in Appendix I. The Cities of Carlton and McMinnville are not participating in this hazard mitigation planning process. However, the document has been designed to easily add the jurisdiction should they choose to participate in the future.

### 3.1 OVERVIEW OF PLANNING PROCESS

#### 3.1.1 2014 Plan Update

This 2014 Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update is intended to: include identified hazards affecting individual jurisdictions; supplement the risk assessment and vulnerability analysis performed in the 2009 plan update; provide community based mitigation actions; identify funding sources; and include the incorporated jurisdictions within the county as part of the update.

The first step in the planning process was to establish Steering Committees within each participating jurisdiction. These Steering Committees consisted of county and city representatives, and representatives from the rural fire districts within the County. Sue Lamb, Yamhill County Emergency Manager served as the primary point of contact for the overall plan update and development. Table 3-1 identifies the Steering Committee leaders and participants from each jurisdiction.

Once the Steering Committees were formed, the following six-step planning process took place from February to July 2014.

- **Organize Resources:** The Steering Committees identified resources, including county staff, city departments and agencies, and local non-governmental organizations (NGOs), which could provide the technical expertise and historical information needed to update the NHMP.
- **Profile Hazards:** Each Steering Committee identified the hazards specific to Yamhill County and the cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina, and Yamhill City. A hazard analysis was developed for these nine hazards.
- **Assess Risks:** A vulnerability analysis was developed for the county and each of the incorporated communities. The county and incorporated communities used the vulnerability analyses results in the mitigation strategy development.
- **Assess Capabilities:** Each Steering Committee reviewed the current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards in each respective jurisdiction.
- **Develop Mitigation Strategy:** Each Steering Committee developed a comprehensive range of potential mitigation goals and actions. Subsequently, Yamhill County and the incorporated communities identified, evaluated, and

prioritized the actions to be implemented in the county- and city-specific Mitigation Action Plans (Section 7).

- **Monitor Progress:** Each Steering Committee developed an implementation process to ensure the success of an ongoing program to minimize hazard impacts to Yamhill County and the incorporated communities.

### 3.2 HAZARD MITIGATION STEERING COMMITTEE

#### 3.2.1 Formation of the Steering Committee

This planning update process began in February 2014. Each Steering Committee leader formed the advisory body, known as the Steering Committee, using staff from relevant local departments, and agencies. The Steering Committee members representing community members within Yamhill County and each of the county's eight participating incorporated cities, are listed in Table 4-1 and the meetings held throughout the planning process are described below. In addition, the meeting agendas and handouts are provided in Appendix D.

**Table 3-1. Steering Committees**

Name	Agency/Department
Yamhill County	
Sue Lamb	County Emergency Manager
Ken Friday	Planning Division Manager
Ken Nygren	County Assistant Emergency Manager
Bill Gille	County Engineer
Gary Van Der Veen	County Environmental Health Specialist
Sarah Bates	Public Health Preparedness Coordinator
Chris Shultz	Community Preparedness Specialist
City of Amity	
Larry Layton	City Administrator
Matt Johnson	Public Works Superintendent
Michael Cape	Mayor
Charles Eaton	City Engineer
City of Dayton	
Scott Ringel	City Manager
Christy Ellis	Previous City Manager
Ross Schultz	Previous City Manager
Elizabeth Wytoski	Mayor
Steve Sagmiller	Public Works Director
City of Dundee	
Rob Daykin	City Administrator
Al Mustain	Superintendent of Public Works
John Stock	Fire Chief
City of Lafayette	
Preston Polasek	City Administrator
Chris Heisler	Mayor
Terry Lucich	Fire Chief

**Table 3-1. Steering Committees**

<b>Name</b>	<b>Agency/Department</b>
Jim Anderson	Public Works Foreman
Lori Martino	Community Development Clerk
<b>City of Newberg</b>	
Brittney Jeffries	Public Affairs Officer
Mary Newell	Police Support Services Manager
Jay Harris	Public Works Director, Pro-Tem
Steve Olson	Building and Planning Director, Pro-Tem
<b>City of Sheridan</b>	
Frank Sheridan	City Manager
Yvonne Hamilton	Deputy City Recorder
Kie Cottam	Director of Public Works
<b>City of Willamina</b>	
Chris Ann Harris	Office Coordinator
Jeff Brown	Public Works Superintendent
Charlene Brown	Museum Curator
Dave Morey	Fire Department
Matt Reneiss	Fire Department
<b>City of Yamhill</b>	
Richard Howard Sr.	Public Works Superintendent
Lori Gilmore	City Recorder/Treasurer
Paula Terp	Mayor
Jo Weinstein	City Councilor
Kay Echaui	City Councilor
Jay Disbrow	City Councilor

### **3.2.2 Planning Team Meetings**

Yamhill County's contractor, Oregon Partnership for Disaster Resilience, provided technical guidance throughout the planning process.

#### **February 26, 2014**

During the kickoff meeting, Oregon Partnership for Disaster Resilience (OPDR) staff discussed the project's objective of updating Yamhill County's existing mitigation plan to include the incorporated cities within the county with the end result of a multi-jurisdictional all-hazards mitigation plan. The DMA 2000 requirements, the hazard mitigation planning process, public outreach opportunities, mitigation projects and grant funding opportunities, steering committee formation, were also discussed. Additionally OPDR gathered data from participants to update hazard histories and facilitated a discussion about the mitigation strategies proposed in the 2009 NHMP Update.

Each jurisdiction filled out data collection forms to assist in updating hazard identification and hazard histories. The hazard identification data collection form was based on the State of Oregon Natural Hazards Mitigation Plan and the existing Yamhill County Hazard Mitigation Plan and is meant to familiarize city representatives with the



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## Planning Process

approach and concepts used in the risk identification phase of NHMP development. Nine natural hazards were determined to pose the greatest potential risk in Yamhill County and participating jurisdictions. Those include erosion (riverine), drought, earthquake, landslide/debris flow, volcanic eruption, wind storm, winter storm, and wildland/urban interface fire.

### ***April 9, 2014***

In the second steering committee meeting, OPDR facilitated a discussion regarding proposed changes to the 2009 hazard list. The steering committee reached a consensus to accept the natural hazards listed above, deleting El Nino/Southern Oscillation and expansive soils from the natural hazards of concern. The committee also agreed that because technological hazards were not to be updated they would be moved from the NHMP document's base list to an appendix. The discussion of the hazards was followed by a presentation regarding public involvement strategies for the current NHMP update process and for plan maintenance between 2014-2019.

The majority of the meeting time was spent in exercises used to update the county and jurisdictions' vulnerabilities analysis. Participants reviewed key takeaways from the 2009 Threat Assessment and then identified assets and vulnerabilities by focusing on various systems: human population, economic assets, cultural and historic resources, infrastructure and critical facilities, and environmental assets. Each jurisdiction filled out worksheets to help identify assets and vulnerabilities. Responses on the worksheets helped to guide a discussion about shared and unique vulnerabilities. A brief discussion comparing State of Oregon hazard mitigation planning goals and the 2009 Yamhill County Mitigation goals closed out the meeting, priming participants for a more robust discussion of mitigation goals, strategies, and action items to come in the final steering committee meeting.

### ***May 21, 2014***

In the final steering committee meeting, OPDR facilitated a discussion to update the mitigation goals from the 2009 NHMP. OPDR proposed changes and additions to the existing goal language based on a review of goals contained in the Oregon NHMP. The steering committee discussed the proposed updates, made suggestions for language and other additional goals, and came to consensus regarding the final mitigation goals for the 2014 NHMP.

The second section of the meeting was devoted to prioritizing mitigation action items. Meeting participants reviewed mitigation action items from the 2009 NHMP as well as vulnerabilities identified in the April 9, 2014 meeting as a starting point to select and add to their list of action items for the 2014 NHMP update. Participants prioritized 3-5 action items per jurisdiction based on their importance, feasibility and relationship to key community vulnerabilities. After identifying the prioritized actions, participants filled out detailed action item worksheets to be added to the NHMP document.

The last major component of the meeting was a discussion of implementation and maintenance plans. OPDR presented an overview of potential structures for the implementation and maintenance plans. The Yamhill County Emergency Manager facilitated a group discussion to refine the implementation and maintenance strategy.

### 3.3 PUBLIC INVOLVEMENT

On May 27, 2014, shortly after the final Steering Committee meeting, Yamhill County distributed a survey throughout the County and to participating jurisdictions regarding the preparation of the NHMP. Links to the survey and the 2009 NHMP were posted on Yamhill County Emergency Management's website and Facebook page. All residents of Yamhill County were invited to participate. Participating jurisdictions also posted the survey link to their websites and Facebook pages. The county held the survey open until June 30<sup>th</sup>, 2014.

During community events the County and participating jurisdictions offered survey questions as dot charts to allow the public to respond to the survey in person. At these community events copies of the 2009 NHMP and the draft 2014 NHMP were available for the public to review.

Participating cities also held public hearings and open city council work sessions to inform the public about the NHMP update process and to gather public comments. Cities used school newsletters, community calendars, bulletin boards, press releases in local newspapers, radio stations, Facebook pages, and city websites to inform the public about opportunities to comment on the NHMP update. Copies of the draft 2014 NHMP were distributed with comment sheets in public places such as city halls and public libraries as well.

Copies of public involvement announcements are included in Appendix E and the public involvement mechanisms used are included in each jurisdiction specific addendum

### 3.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Steering Committees reviewed and incorporated information from existing plans, studies, reports, and technical reports into the NHMP. A detailed list of references used throughout the document is included in Section 9. A synopsis of the sources follows.

- *Yamhill County Natural Hazards Mitigation Plan*: The Yamhill County Natural Hazards Mitigation Plan includes resources and information to assist county residents, public and private sector organizations and others interested in participating in natural hazard mitigation activities.
- *Yamhill County Comprehensive Plan*: The land use element provided information on existing land use and future development trends. The safety element provided information for the hazard profiles and development of the mitigation strategy for landslides, fire, and flood hazards. The seismic safety element provided information for the hazard profile section and the mitigation strategy for earthquakes and tsunamis.
- *Yamhill County Zoning Ordinance*: These codes regulate development and land use; they were used to develop the capability assessment and the mitigation strategy.

## Planning Process

- *Lower Yamhill Watershed Assessment*: The overriding purpose of the assessment is to evaluate the natural and human processes influencing the watershed's ability to produce clean water and suitable habitat for aquatic life
- *Oregon's Statewide Natural Hazard Mitigation Plan*: This plan, prepared by the State Interagency Hazard Mitigation Team, was consulted to establish consistency with the State hazard mitigation plan.
- *Yamhill County Economic Development Plan*: This document sets out a five-year strategic plan for Yamhill County's economic development efforts.
- *Yamhill County Public Health Comprehensive Plan*: This plan describes the status of health needs and unmet needs in Yamhill County with discussion surrounding on local public health services, basic services, and additional services. Hazards are discussed in the section on additional services in the context of public health preparedness.
- *Ten Year Ending Homelessness Plan*: This document, developed in 2009, presents strategies to prevent eventually eliminate chronic homelessness in Yamhill County and its jurisdictions. Strategies include provision of permanent housing and coordinated services.
- *Yamhill Watershed Culvert Prioritization and Action Plan for Fish Passage*: This plan, developed in 2012 by the Bureau of Land Management, surveys 178 culverts to prioritize culvert upgrades for fish passage. In places where the fish passage needs coincide with needs for flood control actions can be clustered between partners to leverage more funding opportunities for projects.

Section 7 includes the incorporated city-specific existing plans, studies, and reports used during the update.

## 4 HAZARD PROFILES

This section identifies and profiles natural hazards that could affect Yamhill County.

### 4.1 HAZARD ANALYSIS OVERVIEW

A hazard analysis includes the identification, screening, and subsequent profiling of each hazard. Hazard identification is the process of recognizing the natural or human-caused events that threaten an area.<sup>2</sup> While this plan focuses on natural hazards, other hazards identified in early versions of the plan are listed. However, the county did not consider these hazards specifically or make updates to non-natural hazard information as part of the 2014 update process.

Even though a particular hazard may not have occurred in recent history in the study area, all hazards that may potentially affect the study area are considered; the hazards that are unlikely to occur, or for which the risk of damage is accepted as being very low, are eliminated from consideration.

Hazard profiling is accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, and probability. Hazards are identified through the collection and review of scientific, historical and anecdotal information, review of existing plans and studies, and preparation of hazard maps of the study area. Hazard maps are used to determine the geographic extent of the hazard and define the approximate boundaries of the areas at risk.

### 4.2 HAZARD IDENTIFICATION AND SCREENING

The requirements for hazard identification, as stipulated in DMA 2000 and its implementing regulations, are described below.

#### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

##### Identifying Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction.

##### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

<sup>2</sup> Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude. Human-caused hazards result from human activity and include technological hazards and terrorism. Technological hazards are generally accidental or result from events with unintended consequences (for example, an accidental hazardous materials release). Terrorism is defined as the calculated use of violence (or threat of violence) to attain goals that are political, religious, or ideological in nature.

## Hazard Profiles

Prior iterations of the NHMP identified 19 possible hazards that could affect Yamhill County and the participating communities. The Steering Committees evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard (Table 4-1). The Steering Committees determined that 8 natural hazards pose the greatest threat to the county: flood, winter storm, landslide, wildland/urban fire, earthquake, volcano, wind, erosion, and drought.

The following technological hazards are also included in the plan: dam failure, disruption of utility and transportation systems, hazardous materials, terrorism, and infectious disease epidemic. Note that these hazards have not been updated or changed since the 2008 NHMP update and their profiles have been moved to Appendix I: The remaining hazards excluded through the screening process were considered to pose a lower threat to life and property in the county due to the low likelihood of occurrence or the low probability that life and property would be significantly affected.

The County also used the State of Oregon's 2012 Natural Hazards Mitigation Plan (ORNHMP) as a screening element for Yamhill County's NMHP. The ORNHMP identifies the following eleven natural hazards that pose the most serious risk to Oregon: coastal erosion, droughts, dust storms, wind earthquakes, fire, flood, landslide and debris flow, tsunami, volcanoes, windstorms, and winter storms. Because Yamhill County is inland, coastal erosion and tsunami were eliminated. However the ORNHMP does not include riverine erosion, which is a chronic hazard in Yamhill County and has been included in the Yamhill County hazards profile.

**Table 4-1. Identification and Screening of Hazards**

Hazard Type	Should It Be Profiled?	Explanation
<b>Natural Hazards</b>		
Avalanche	No	Yamhill County is not located in an area prone to frequent or significant snowfall.
Erosion (Coastal)	No	Yamhill County is located inland and is not subject to coastal erosion impacts.
Erosion (Riverine)	Yes	Yamhill County is located inland and is not subject to coastal erosion. Riverine and tributary erosion occurs throughout the county in localized area.
Drought	Yes	Similar to the entire State of Oregon, Yamhill County is subject to impacts associated with drought.
Dust Storm	No	No historic events have occurred in Yamhill County or other jurisdictions.
Earthquake	Yes	Yamhill County is located within the geographical area bordering the Cascadia Subduction Zone and is subject to impacts associated with earthquakes.
El Niño / La Niña	No	Historic El Niño / La Niña patterns have been observed affecting weather patterns throughout the state. However, because El Niño / La Niña patterns cause other natural hazards, this document will focus on those hazards (ie-

**Table 4-1. Identification and Screening of Hazards**

Hazard Type	Should It Be Profiled?	Explanation
		flooding, drought, winter storm, etc.) The State of Oregon does not include El Niño / La Niña in its hazard list. Discussion of El Niño / La Niña patterns is made in appropriate hazard sections.
Expansive Soils	No	No historic events have occurred in Yamhill County or other jurisdictions. The State of Oregon does not include expansive soils in its hazard list.
Flood	Yes	Historic flooding has been identified as occurring throughout Yamhill County.
Landslide/Debris Flow	Yes	Yamhill County is vulnerable to slope instability, especially after prolonged rainfalls.
Tsunami	No	Yamhill County is located inland and is not subject to tsunami impacts.
Volcano	Yes	Yamhill County is located in the vicinity of active volcanoes.
Wind	Yes	Yamhill County is vulnerable to high winds.
Winter Storm	Yes	Winter storms in Yamhill County result in several natural hazards-including floods, ice formations, snow, and wind.
Wildland/Urban Interface Fire	Yes	The terrain, vegetation, and weather conditions in the region are favorable for the ignition and rapid spread of wildland fires in Yamhill County.
<b>Man-Made/Technological Hazards (profiles can be found in Appendix I)</b>		
Dam Failure	Yes	Several dams are located within Yamhill County.
Disruption of Utility and Transportation Systems	Yes	Yamhill County is subject to the impacts of disruption of utility and transportation systems.
Hazardous Materials	Yes	Hazardous materials facilities and major transportation routes are located throughout Yamhill County and all jurisdictions.
Terrorism	Yes	Terrorism impacts have been identified in several jurisdictions within Yamhill County.
Infectious Disease Epidemic	Yes	One jurisdiction identified Infectious Disease Epidemic as a hazard.

Table 4-2 shows the natural hazards for the County and participating jurisdictions for the County's update process. Again, where hazards were excluded through the screening process by each jurisdiction, they were considered to pose a lower threat to life and property due to the low likelihood of occurrence or the low probability that life and property would be significantly affected. Should the risk from these hazards increase in the future, the NHMP can be updated to incorporate vulnerability analyses for these and other identified hazards.

Table 4-2. Hazards by Jurisdiction

Hazard	Yamhill County	City of Amity	City of Dayton	City of Dundee	City of Lafayette	City of Newberg	City of Sheridan	City of Willamina	City of Yamhill
Drought	X	X	X	X	X	X	X	X	X
Earthquake	X	X	X	X	X	X	X	X	X
Erosion	X		X	X		X		X	
Fire (Wildland/Urban)	X	X	X	X	X	X	X	X	X
Flood	X	X	X	X	X	X	X	X	X
Landslide	X		X	X	X	X	X	X	X
Volcano	X	X	X	X	X	X	X	X	
Wind	X	X	X	X	X	X	X	X	X
Winter Storm	X	X	X	X	X	X	X	X	X

### 4.3 CONTRIBUTING FACTORS

Individual hazard events can be impacted by regional or global systems. El Niño/Southern Oscillation (ENSO) comprise two weather phenomena known as El Niño and La Niña that impact Yamhill County. While *ENSO activities are not hazards* per se, ENSO can influence weather patterns that contribute to or result in natural hazards and large-scale damage throughout the jurisdictions in Yamhill County. Direct correlations have been found linking ENSO to severe weather across the Pacific Northwest, particularly drought, flooding, and severe winter storms (State of Oregon 2004). Therefore, increased awareness and understanding of the impacts of El Niño and La Niña on regional weather are important in hazard mitigation planning. In general, El Niño periods result in warmer temperatures and lower precipitation, while La Niña periods are colder and wetter (Lubomudroy 2008).

In the past 100-years, climate changes observed in the Pacific Northwest of the United States have included average annual temperature increases, lower daily minimum temperatures in the winter season, increases in cool season precipitation, decreases in snow at low and middle elevations and earlier peak runoff of snowmelt, especially in mountain plateaus (CIG). Changes in precipitation and melting snow and ice, for example, will affect the quantity and quality of hydrological systems. Changes in temperature, habitat quality and access to food and water will continue to cause changes in the geographic ranges, seasonal activities, migration patterns, abundance, and species interactions of terrestrial, freshwater, and marine species. Climate change impacts will also impact agricultural crop yields; for example climate change has already shown negative impacts to the global aggregate of wheat and maize. Human health implications of climate change include increases in heat- and cold-related deaths as well as increased

distribution of water-borne illnesses and disease vectors in areas that have experienced temperature and rainfall changes.

#### **4.4 SECONDARY AND COMPOUNDING HAZARDS**

Primary natural hazard events frequently trigger secondary hazards, increasing potential loss to life and property. It is important to consider the compounding effects that may occur when multiple natural hazards impact an area. In these cases, the effects of hazards can be magnified to create a disaster that would not be present if only one hazard incident had occurred. For instance the eruption of Mt. St. Helens in 1980 triggered an earthquake, landslides floods, and wildfires (Paul 2011).

Similarly, compounding disasters occur when one or more hazards impact a region, either simultaneously or sequentially. In these cases, multiple hazards exacerbate the impacts to a region, often resulting in a disaster where one would not have otherwise resulted. For instance, extreme cold caused by a winter storm could be compounded by heavy rains to create freezing and flooding in a region. These sequential events would cause more impacts to transportation, water, and power infrastructure than a winter storm alone might because of freezing on roadways, overwhelming of storm sewers, and ice on overhead power lines. Table 4-3 shows primary natural hazards and commonly associate secondary hazards (Paul 2011).

**Table 4-3 Primary and Secondary Hazards**

<b>Primary Hazard</b>	<b>Secondary Hazards</b>
Earthquakes	Landslides, tsunamis, fires, floods
Volcanic eruptions	Earthquakes, wildfires, floods
Wildfires	Landslides, public health concerns (air quality)
Severe storms	Tornadoes, floods, fires (lightning)
Floods	Fires, public health concerns
Landslides	Tsunami, flooding
Extreme summer weather	Wildfires

Source: Adapted from Paul, B. K. (2011). Environmental hazards and disasters: Contexts, perspectives and management. Chichester: Wiley-Blackwell.



### 4.5 HAZARD PROFILES

The requirements for hazard profiles, as stipulated in DMA 2000 and its implementing regulations, are described below.

#### DMA 2000 Requirements: Risk Assessment-Profiling Hazards

##### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

##### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

##### Profiling Hazards

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

##### Element

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))
- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

Source: FEMA, March 2013

This section presents profiles of the specific hazards selected by the Steering Committees in a methodical manner based on the following factors:

- Nature
- History
- Location
- Extent
- Probability of future events

Hazards are presented alphabetically; the order of presentation does not signify the level of importance or risk.

#### 4.5.1 Drought

##### 4.5.1.1 Nature

Drought is variously defined as a period of abnormally dry weather creating hydrologic imbalance, shortage of precipitation adversely affecting crops, or a period of below average water in streams and lakes, reservoirs, aquifers, and soils. (USGS 2008) There is no universal measure of precipitation or dryness that signifies drought. Historically,

## Hazard Profiles

droughts have been seen as unpredictable and unavoidable events. Climate fluctuations occur everywhere, and periods of low precipitation are a normal, recurrent feature of climate.

Drought is commonly referenced in terms of its effects on agriculture, with crop damage or failure used to measure its effects. Other direct environmental effects of drought include livestock death or decreased production, wildland fire, impaired productivity of forest land, damage to fish habitat, loss of wetlands, and air quality effects. Indirect effects to society are measured by the economic and physical hardships brought on by drought and by the increased stress on residents of a drought-stricken area. The economic impact of drought is estimated between \$6 and \$8 billion annually in the United States. These costs primarily affect agricultural, forestry, fisheries, recreation and tourism, transportation and energy sectors. Drought is also associated with insect infestation, disease, and wind erosion.

Drought is usually thought of as a meteorological phenomenon, resulting from abnormally low precipitation. It can also be an institutional phenomenon, resulting from poor management of water supply and reserves—an imbalance in supply and demand—and is often due to a combination of these factors. Understanding drought as a recurring climate cycle is a first step toward creating management practices that effectively mitigate its effects.

Drought is difficult to measure, due to its diverse geographical and temporal nature, and its operation on many scales. Despite that difficulty, various indices for measuring and characterizing drought can be useful. The Palmer Drought Indices and the Standardized Precipitation Index are most commonly used. Palmer's indices describe water balance—looking at water supply (precipitation), demand (evapotranspiration), and loss (runoff)—on three scales; weekly during growing season, long-term cumulative measured by month, and another long-term scale that takes into account hydrological factors such as reservoir and groundwater levels. These are the Crop Moisture Index, the Palmer Drought Severity Index, and the Palmer Hydrological Drought Index, respectively. The Standardized Precipitation Index considers precipitation alone, comparing the probability of a region's receiving a given amount of precipitation (based on historical levels) in a given time period with precipitation actually recorded (NOAA 2008).

There are four types of drought: meteorological, agricultural, hydrological and socioeconomic. Meteorological drought is based on the degree of dryness. Agricultural drought focuses the amount of soil moisture versus the needs of the crops. Hydrological drought is associated with shortfalls of surface and subsurface water supply. Socioeconomic drought refers to physical water shortages and its human effect, and occurs when the need for water exceeds the supply resulting in a shortfall.

El Niño weather patterns can increase the frequency and severity of drought. During El Niño periods, alterations in atmospheric pressure in equatorial regions yield an increase in the surface temperature off the west coast of South America. This gradual warming sets off a chain reaction affecting major air and water currents throughout the Pacific Ocean. In the North Pacific, the Jet Stream is pushed north, carrying moisture laden air up and away from its normal landfall along the Pacific Northwest coast. In Oregon, this shift results in reduced precipitation and warmer temperatures, normally experienced

several months after the initial onset of the El Niño (Taylor 2008). These periods tend to last nine to twelve months, after which surface temperatures begin to trend back towards the long-term average. El Niño periods tend to develop between March and June, and peak from December to April (NOAA 2005).

### 4.5.1.2 History

Drought occurs in all parts of Oregon, and has had profound effects in the past on the state's economy, particularly the agricultural and hydro-power sectors. Environmental consequences have included insect infestations in forests, insufficient stream flows to support endangered fish species, and increased susceptibility to fire.

The following past drought events were recorded for Yamhill County:

- 1928-1941-Statewide prolonged drought caused major agricultural problems
- 1976-1981-Stream flows were low for western Oregon; 1976 and 1977 were the driest years of the century.
- 1985- 1994-Ten consecutive years of drought cause problems statewide; fires were common and insects attacked trees; a drought emergency was declared in 1992. An El Niño was observed in 1994.
- 2000-2001-Severe drought conditions; October 2000 to February 2001 was the second driest period of record in Washington and Oregon.
- 2003-Yamhill County was one of nine counties designated a disaster area brought on by an ongoing drought and became eligible for disaster relief.
- 2005-February 2005 was the driest since 1977 (2006).
- 2009- Moderate to severe drought statewide caused more than half of the topsoil statewide to be reported in "Very Dry" condition. Record low annual rainfall of 20.45" was reported for the year. Well systems between Lafayette and Dayton were impacted (NCDC 2009, YCNH 2014).
- As of May 7, 2013, The National Drought Mitigation Center classified Yamhill County to be in "Abnormally Dry" (CPC 2014).
- As of March 27, 2014, The National Drought Mitigation Center classified Yamhill County to be in a "Moderate Drought." According to the National Weather Service's Climate Prediction Center long-term drought is expected to persist through interior Oregon, including Yamhill County (CPC 2014).

### 4.5.1.3 Location

Droughts occur in every climate zone, and can vary from region to region. Drought occurs in all parts of Oregon, and has had profound effects on the state's economy, particularly the agricultural and hydro-power sectors. All parts of the county are susceptible to drought, however, the following areas and issues are of particular concern:

- Low stream flow in Yamhill City could impact water plant operations, restricting water for residents and for fire-fighting.

- Wells and springs providing city water for Newberg.

### 4.5.1.4 Extent

Drought is often associated with El Niño events affecting the polar and subtropical jet streams. During El Niño years, decreased precipitation and increased temperatures throughout the winter can lead to drought. The polar jet stream dips southward causing the northwest to be drier than average. The severity of drought depends on the degree of moisture deficiency, duration, and size of the affected area. The agricultural sector is usually the first to feel the impacts of drought because of its dependence on soil moisture. Those reliant on surface and groundwater sources are usually the last to feel the effects of drought.

### 4.5.1.5 Probability of Future Events

As part of a statewide HMP process, county emergency management program managers conducted risk analyses to determine probability of, and vulnerability to, severe drought occurrence in each county. Oregon's Partnership for Disaster Resilience assesses Yamhill County as having an average risk for drought; a future drought affecting the planning area is likely (*Partnership* 2008).

Drought appears to be a cyclic part of the climate of Oregon, occurring in both summer and winter, with an average recurrence interval between 8 and 12 years. Short-term, seasonal events are more frequent, while the less frequent, long-term events have ranged from 3 to 12 years in length.

Estimating drought probability and frequency is difficult, but understanding cyclic climate variations and other variables that contribute to weather behavior is advancing (State Interagency Hazard Mitigation Team 2006). Understanding the ENSO weather systems are helping scientists to better predict weather changes in the Pacific Northwest. As climate scientists continue to unravel the oceanic and atmospheric relationships governing ENSO, predictive powers are growing. 1997 marked the first time an El Niño was accurately forecasted, and as more studies detail how ENSO impacts the Pacific Northwest, and Oregon in particular, hazard mitigation agencies will benefit from increased warning time. ENSO generally follows a two to seven year cycle, with El Niño or La Niña periods occurring every three to five years. However, the cycle is highly irregular, and no set pattern exists (Taylor 2008). Furthermore, variations are likely to continue, and not all droughts and floods are related to El Niño or La Niña events (State of Oregon 2004). Both El Niño and La Niña periods tend to develop between March and June, and peak from December to April (NOAA 2005).

## 4.5.2 Earthquake

### 4.5.2.1 Nature

An earthquake is a sudden motion or trembling of the earth produced by the rupture of rocks due to stresses beyond the rocks' elastic limits. The point inside the Earth where the rupture takes place is termed the hypocenter. The point on the planet's surface directly

above the hypocenter is the epicenter. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, or the vibration or shaking of the ground during an earthquake.

The severity of ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. Ground motion causes waves in the earth's interior, also known as seismic waves, and along the earth's surface, known as surface waves. There are two kinds of seismic waves. P (primary) waves are longitudinal or compression waves similar in character to sound waves, that cause back-and-forth oscillation along the direction of travel (vertical motion). S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side to side (horizontal motion). When P and S waves hit the surface of the Earth, they generate surface waves, which are further categorized into Raleigh waves and Love waves. Slower than seismic waves, and therefore later to hit, surface waves are responsible for most of the damage during an earthquake.

Earthquakes are usually measured in terms of magnitude (M) and intensity. Magnitude is related to the amount of energy released during an event, while intensity refers to the effects on people and structures at a particular place. Small to moderate earthquake magnitude is usually reported according to the standard Richter scale. Larger earthquakes are reported according to the moment-magnitude scale because the standard Richter scale does not adequately represent the energy released by these large events.

Intensity is usually reported using the Modified Mercalli (MM) Intensity Scale. This scale has 12 categories ranging from "not felt" to "total destruction." Different values can be recorded at different locations for the same event depending on local circumstances such as distance from the epicenter or building construction practices. Peak ground acceleration (PGA) is also used to measure earthquake intensity. It measures the earthquake's intensity by quantifying how hard the earth shakes in a given location. PGA can be measured in g, which is acceleration due to gravity. Table 4-4 identifies corresponding intensity and magnitude ratings as well as effects associated with each rating.

**Table 4-4 Effects of Intensity and Magnitude Ratings**

Magnitude	MM Intensity	PGA (% g)	Perceived Shaking
0-4.3	I	<0.17	Not Felt
	II-III	0.17-1.4	Weak
4.3-4.8	IV	1.4-3.9	Light
	V	3.9-9.2	Moderate
4.8-6.2	VI	9.2-18	Strong
	VII	18-34	Very Strong
6.2-7.3	VIII	34-65	Severe
	IX	65-124	Violent
	X	124 +	Extreme

In addition to ground motion, several secondary hazards can occur from earthquakes, such as surface faulting. Surface faulting is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (up to 20 feet), as can the length of the surface rupture (up to 200 miles). Surface faulting can cause severe damage to linear structures, such as railways, highways, pipelines and tunnels.

Earthquake-related ground failure due to liquefaction is another secondary hazard. Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its structure, and causing some of the empty spaces between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to briefly become fluid. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles) and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.

The most common earthquakes that occur in Oregon are crustal, intraplate or great subduction earthquakes. Yamhill County is most susceptible to deep intraplate and subduction zone earthquakes. These are described as follows:

**Crustal earthquakes:** These generally occur along shallow faults near the earth's surface. Crustal earthquakes make up the majority of earthquakes in the Cascadia area (western Washington, Oregon and northwestern California) and are a result of fault movement in the Earth's surface. These shallow earthquakes are usually less than 7.5 magnitude and strong shaking generally lasts 20 to 60 seconds. Aftershocks, as well as tsunamis and landslides, are anticipated after a crustal event. The Mount Angel Fault is located approximately 15 miles from Yamhill County, and is responsible for the 5.7 magnitude Spring Break Quake in 1993.

**Intraplate earthquakes:** These occur deeper, at 20 to 40 miles beneath the ground surface. These deep earthquakes are usually less than 7.5 magnitude, and damaging events occur every 10 to 30 years in this region. There are few aftershocks, and tsunamis are generally not anticipated, although landslides can trigger localized tsunamis. Due to the deep earth movement, an intraplate earthquake is felt over a larger area with less intensity. Damage from this type of event is generally less than with an equally sized crustal earthquake.

**Great subduction earthquakes:** occur offshore of the Oregon and Washington Coasts along the Cascadia Subduction Zone. This zone is the result of the Juan de Fuca plate being pushed under the North American plate. Earthquakes centered along this zone can be as great as 9.0 magnitude. Geologic evidence demonstrates approximately 500 years between events with the last significant event on January 26, 1700. Aftershocks up to 7.0 magnitude are anticipated to cause additional damage. Liquefaction, tsunamis and landslides are expected as a result of a great subduction earthquake.

### 4.5.2.2 History

Approximately 7,000 earthquakes in the Pacific Northwest have been documented over the past 200 years. This documentation has occurred sporadically, with only the most significant events being recorded until recent history. More than 6,000 earthquakes have been recorded in Oregon since 1841. Many earthquakes were documented as below a magnitude three. The University of Washington expanded its seismograph coverage of Yamhill County and northwestern Oregon in 1980.

Currently, the University of Washington seismology laboratory records approximately 1,000 earthquakes of magnitude 1.0 or greater annually in Washington and Oregon. While most of these events are barely felt, anywhere from 12 to 24 earthquakes cause enough ground shaking to be recognized as an actual earthquake by area residents. Table 4-5 shows magnitude 4.0 or greater earthquakes affecting the planning area since 1949. Figure A-7 shows historic earthquakes affecting the region from 1840-2006.

- The February 28, 2001 Nisqually earthquake caused evacuations in Yamhill County and Willamette Valley, and damage was reported to the Dundee Fire Hall.
- The Scott Mills earthquake cause bricks to fall from an un-reinforced masonry building in Dayton and approximately 90 buildings were damaged in Newberg. The Dayton Bridge on Highway 18 was closed for structural damage. The Highway 18 at Highway 99 West was closed and Portland General Electric reported power outages to customers in Dundee.

**Table 4-5 Magnitude 4.0 or Greater Earthquakes, 1949 - 2013**

Date	Magnitude	Location
April 13, 1949	7.1	Olympia, WA
April 18, 1961	4.5	Albany, OR
November 5, 1962	5.5	Vancouver, WA
March 7, 1963	4.6	Salem, OR
March 25, 1993	5.6	Scotts Mills, OR
February 28, 2001	6.8	Anderson Island, WA
June 29, 2002	4.5	Mt. Hood, OR
June 30, 2004	4.4	Lakeview, OR
July 12, 2004	4.9	Newport, OR
July 22, 2004	4.3	Lakeview, OR
August 18, 2004	4.7	Newport, OR
July 14, 2008	4.2	Maupin, OR
January 30, 2009	4.5	Seattle and Tacoma, WA
October 13, 2011	5.3	Off the Oregon Coast, OR
April 11, 2012	5.9	Off the Oregon Coast, OR
February 15, 2012	6.0	Off the Oregon Coast, OR

Source: 2014 *Significant Earthquakes Archive*. (n.d.). Retrieved from <http://earthquake.usgs.gov/earthquakes/eqinthenews/> May 2014

### 4.5.2.3 Location

Yamhill County is located within the geographical area bordering the Cascadia Subduction Zone. This zone is comprised of an 800-mile sloping fault and several smaller offshore faults located west of the Pacific Coast, from British Columbia to the north and Northern California to the south. The fault system separates the Juan de Fuca and North American plates. A series of inferred faults, faults extending underground from a visible fault, and concealed faults are present near Dayton, south of McMinnville.

Inland, there are nine faults located within the USGS Quaternary Fault and Fold Database for the Salem 1° x 2° Sheet (44°-45° by 124°-122°), including the Portland Hills Fault, East Bank Fault, and Mount Angel Fault. Major offshore and onshore faults are shown in Figure A-8.

Shaking hazard maps produced by the United States Geological Survey (USGS) consider two alternative scenarios for damaging earthquakes (M 8.3 or M 9.0) along the subduction zone. The shaking hazard maps show the level of ground motion that has 1 chance in 475 of being exceeded each year, which is equal to a 10 percent probability of being exceeded in 50 years. As such, as shown in Figures A-9 and A-10, the planning area falls within the strong to very strong shaking range (9-25 percent of acceleration of gravity). All of Yamhill County may be subject to an earthquake. However, the western portion of Yamhill County is more likely to be more affected by a major quake, because of closer proximity to the Cascadia Subduction Zone.

### 4.5.2.4 Extent

The extent of earthquake effects depends on the nature, magnitude, and location of the quake. An earthquake can be anything from a tiny tremor affecting only a very localized area, to a major shake that affects an entire region. It is expected that earthquakes in Yamhill County would affect water and sewer systems, natural gas lines, bridges and power/electrical systems. For hazard mitigation purposes, it should be considered that the extent of a major event would be greater than county-wide.

### 4.5.2.5 Probability of Future Events

Oregon ranks third for future earthquake damages, with losses of exceeding \$12 billion in an 8.5 magnitude Cascadia Subduction Zone earthquake. Recent research shows the Cascadia Subduction Zone is capable of producing a 9.0+ M earthquake. The risk of damage to structures and human life is greater today because of the increase in population. In 1993, Oregon updated its development code, requiring structures to be able to withstand shaking from M 9.0 earthquake. Structures and utility infrastructure built before 1993 were not designed to withstand an earthquake.

Geological evidence indicates that damaging subduction earthquakes (M 8.3 to M 9.3) have occurred at least seven times in the last 3,500 years, suggesting a return time of 300 to 600 years. While it is impossible to predict when an earthquake may occur, it is highly likely that a severe earthquake (M 8.0-9.0 and greater) will occur along the Cascadia Subduction Zone, thereby affecting Yamhill County.

According to Oregon's 2012 Natural Hazard Mitigation Plan:



*The Cascadia Subduction Zone closely mirrors the subduction zone in northern Japan that produced the 2011 Tohoku earthquake. This magnitude 9 megathrust event and its associated tsunami captured the world's attention with unforgettable images of destruction on a massive scale. Oregon should regard this as a window into our future, as this is the very type of earthquake that our best science tells us is likely on the Cascadia Subduction.*

Crustal earthquakes also occur in the Willamette valley although with smaller expected magnitudes (M 5.0-M 7.0). Although these earthquakes are expected to be much smaller than a Cascadia Subduction Zone earthquake, they are more likely to occur close to population centers and are capable of causing severe shaking and damage in localized areas (OPDR & OEM 2012).

### 4.5.3 Erosion

#### 4.5.3.1 Nature

Erosion is a process that involves the gradual wearing away, transport, and movement of land. However, not all erosion is gradual. It can occur quite quickly as the result of a flash flood, coastal storm, or other event. Most of the geomorphic change that occurs in a river system is in response to a peak flow event. It is a natural process but its effects can be exacerbated by human activity.

Although the State of Oregon Natural Hazard Mitigation Plan does not include riverine erosion among its profiled hazards, this document identifies it as a chronic hazard with a history of impacting infrastructure and properties throughout Yamhill County.

Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure. There are two primary types of erosion that affect human activity in Yamhill County.

- **Wind erosion** occurs when wind removes, moves, and re-deposits soil. It can cause a loss of topsoil, hindering agricultural production. Blowing dust can also reduce visibility and have a negative effect on air quality.
- **Riverine erosion** results from the force of flowing water in, and adjacent to, river, creek, and tributary channels. This erosion affects the bed and banks of the channel and can alter or preclude any channel navigation or embankment development. In less braided river channel reaches, erosion and material deposition are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally.

Various communities along the rivers, creeks, and tributaries in Yamhill County have identified riverine erosion as a threat to their community. Erosion of any type rarely causes death or injury. However, erosion can cause significant destruction to property and infrastructure.

Generally erosion occurs when the flow of the river changes and is directed towards the banks or mid-channel islands. These changes can be caused by surface wind stress and gravity waves that occur during storm events (primarily severe winter storms), transporting sediment by bottom currents (Sternberg 1986).

### 4.5.3.2 History

The following descriptions provide a brief overview of historic erosion events in Yamhill County.

- Riverine erosion in local creeks occurred with minimal damage with culverts being filled and backed up during the 1964 flood event.
- The City of Willamina has lost 20 feet of embankment from Willamina Creek and has experienced erosion along the Yamhill River.
- Erosion has caused disruptions in the storm sewer system in Lafayette.

### 4.5.3.3 Location

Erosion loss has historically occurred in Yamhill County from landslides, stream bank failures, and agricultural activities. All rivers and creeks are subject to erosion. Yamhill County has approximately 113 rivers and creeks. Some of those potentially threatened by erosion include the Willamette, Wind, and North and South Yamhill Rivers; and Ash, Berry, Baker, Fairchild, Maroney, Perkins, Turner, Petch, Panther, and Willamina Creeks. The County experiences annual rain and wind events that assail river shorelines combined with landslides and debris flows within the watersheds, loss of plant cover in riparian areas, and river traffic induced erosion, particularly during severe storm events.

Table 4-6 lists erosion hazard areas identified by the Steering Committees in each jurisdiction (Figures A-14-A-14F)

**Table 4-6 Erosion Hazard Areas within Yamhill County**

Community	Description of Location
City of Amity <sup>c</sup>	Water intake area in Salt Creek?
City of Carlton <sup>1</sup>	Hawn Creek and North Yamhill River
City of Dayton <sup>2</sup>	Yamhill River, Palmer Creek, and West-Fork Palmer Creek
City of Dundee <sup>3</sup>	Willamette River
City of Newberg <sup>b</sup>	Willamette River, <sup>c</sup> Road systems are damaged (cracks and potholes) due to erosive soil conditions, in general hillsides with springs are of concern
City of Willamina <sup>a</sup>	<sup>a</sup> Willamina Creek, South Yamhill River, <sup>c</sup> Water intake area is especially prone to bank erosion
City of Yamhill	Yamhill Creek near waste water plant
County <sup>b</sup>	<sup>a</sup> Ferry & Webfoot Subdivision, <sup>b</sup> Canary grass has been planted causing tree reduction <sup>c</sup> Laughlin Rd., Puddy Gulch, Rodgers Landing Park, and Lambert Bend are ongoing areas of concern

<sup>1</sup>-City of Carlton Hazard Mitigation Planning Steering Committee, August, 2008.

<sup>2</sup>-City of Dayton Hazard Mitigation Planning Steering Committee, August, 2008.

<sup>3</sup>-City of Dundee Hazard Mitigation Planning Steering Committee, August, 2008.

<sup>4, a</sup>-City of Willamina Hazard Mitigation Planning Steering Committee, August 2008

<sup>5</sup>-City of Dundee Hazard Mitigation Planning Steering Committee, August, 2008.

<sup>6</sup>-City of Newberg Hazard Mitigation Planning Steering Committee, August, 2008.

<sup>a, b</sup>-Verbal comments from Rita Baller 8/18/08 to Laura Young.

<sup>c</sup> Yamhill County Natural Hazard Mitigation Plan Steering Committee, February 26, 2014

#### 4.5.3.4 *Extent*

A variety of natural and human-induced factors influence the erosion process. For example, embankment orientation and exposure to prevailing winds (which can be altered by human development) all influence erosion rates. Other factors that may influence riverine erosion include:

- Geomorphology (composition)
- Structure types along the river embankments
- Development density
- Amount of encroachment in the high hazard zone
- Proximity of erosion-inducing structures
- Nature of the shoreline topography
- Embankment elevation
- Embankment wind exposure

Rivers constantly alter their courses, changing shape and depth, trying to find a balance between the sediment transport capacity of the water and the sediment supply. This process, called riverine erosion, is usually seen as the wearing away of the water course's banks and beds over a long time period.

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure.

Landslides, debris flow scour, embankment failure, or heavy rainfall often initiated riverine erosion. These processes generate high volume and velocity run-off which will concentrate in the lower drainages within a river's catchment area. When the stress applied by these flows exceeds the resistance of the embankment material, erosion will occur. As the sediment load increases, fast-flowing waters will erode their banks downstream. Eventually, the river, creek, or tributary becomes overloaded or velocity is reduced, leading to the deposition of sediment further downstream or in dams and reservoirs. The deposition may eventually lead to the watercourse developing a new channel.

While all rivers change in the long-term, short-term change rates vary significantly. All rivers can be categorized based on their ability to adjust their shape and gradient as either bedrock or alluvial channels.

The erosion rate depends on the sediment supply and amount of run-off reaching the watercourse. These variables are affected by many factors including earthquakes, floods, climatic changes, loss of bank vegetation, urbanization, and the civil works construction projects in the waterway.

Erosion along the banks of the rivers and streams in Yamhill County is generally caused by a combination of factors:

- The natural process of a watercourse to find the path of least resistance.
- Debris flows within the watershed.
- Loss of riparian area plant cover.
- Logging.
- Increased boat traffic close to the shoreline.
- Runoff from rainfall.

While erosion has been identified as occurring within the county, few events were reported to result in damage. Based on past events and the lack of development in proximity to erosion hazard areas, the magnitude and severity of erosion impacts in the County are considered negligible, with the potential for critical facilities to be shut down for 24 hours or less, and less than 10% of property or critical infrastructure being severely damaged.

#### **4.5.3.5 Probability of Future Events**

Based on historic events it is possible that structures located near the shoreline of the County's major rivers, creeks, and their tributaries are vulnerable to erosion. Erosion data is limited to localized geographic areas within the County identified by the participating jurisdictions.

### **4.5.4 Flood**

#### **4.5.4.1 Nature**

A flood is the temporary inundation of water or mud on normally dry land. Heavy or prolonged rain, snowmelt, or dam collapse can cause inundation, as can riverine and flash floods (NOAA 2008). Urban and riverine flooding primarily affect Yamhill County.

Urban flooding occurs in developed areas where the amount of water generated from rainfall and runoff exceeds the stormwater systems' capacity. As land is converted from agricultural and forest to urban uses, it often loses its ability to absorb rainfall. Rain flows over impervious surfaces such as concrete and asphalt and into nearby storm sewers and streams. This runoff can result in the rapid rise of floodwaters. During urban floods, streets can become inundated, and basements can fill with water. Storm drains often back up because of the volume of water and become blocked by vegetative debris like yard waste, which can cause additional flooding. Development in the floodplain can raise the base flood elevation and cause floodwaters to expand past their historic floodplains (FEMA 2008c).

Riverine or overbank flooding of rivers and streams is the most common type of flood hazard. Riverine flooding most frequently occurs in winter and late spring. Air rises and cools over the Coast Range and its foothills and heavy rainfall develops over high-elevation streams, as storms move from the Pacific across the Oregon Coast. In this

region, as much as four to six inches of rain can fall over a 24-hour period. Severe and prolonged storms can raise rivers and streams to their flood stages for three to four days or longer (State of Oregon 2008).

Floods usually are the result of prolonged rainfall over a large area from major weather systems that cause flooding of smaller streams that flow into major rivers. This type of flood and inundation of the natural floodplains of the river system is a part of the natural process. Development in or near the floodplain puts lives and property at risk.

Flood damage can include:

- Inundation of structures
- Damage to transportation infrastructure and closure of lifeline routes
- Erosion of stream banks, road embankments, foundations, footings for bridge piers and other features
- Impact damage from high-velocity flow and from debris
- Additional debris damage from accumulation on or blockage of infrastructure
- Destruction of croplands
- Release of sewage and hazardous or toxic materials from damaged pipelines, tanks, and facilities
- Economic loss (local facilities, utilities, communications, agriculture)

#### 4.5.4.2 History

The Willamette, North Yamhill, and South Yamhill rivers and smaller tributaries are susceptible to annual floods (Yamhill County Emergency Management 2006).

The Willamette River has flooded on many occasions with the largest flood in 1861. In 1880 another large flood damaged the Yamhill River Bridge and washed out portions of the Willamette Valley Railroad's track. Flood control dams constructed in the 1940s and 1950s have changed the flooding pattern. The largest and most damaging was the 1964 flood, which FEMA categorized as a 100-year flood event. The most recent flood event occurred in December 2007. The following list summarizes significant flood events in Yamhill County.

- December 1964-January 1965. Two storm systems brought record rainfall to the region that had already experienced record, early season low-elevation snow. In Yamhill County, the flooding caused 10 deaths and hundreds of landslides, washed out roads and bridges, and damaged or destroyed houses. Thousands evacuated and the entire state was declared a disaster area.
- January 1974. Snowmelt caused by a series of storms combined with heavy snow and freezing rain to produce rapid runoff. Several roads were closed because of landslides and high water including some roads in Sheridan and Willamina. In several communities along the Willamette River, wastewater plants exceeding capacity discharged raw sewage into the river.

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- February 1986. The flood was caused by heavy rains and snow melt. The Willamette River crested at 29 feet and was within inches of flooding. Homes were flooded and highways closed.
- February 1996. A series of floods were caused by deep snow pack, warm temperatures, and record-breaking rain. The City of Carlton's wastewater treatment plant overflowed into the North Yamhill River. Total damages in the county exceeded \$4 million.
- November 1996. A warm weather system deposited heavy rain on the area causing flooding. La Niña was observed in 1996-1997.
- January 1997. Heavy rains caused flooding throughout the county. Willamette River crested at 29 feet, one foot above flood level. The South Yamhill River at McMinnville crested at 55 feet, five feet above flood level. Five thousand residents lost power when high winds damaged power lines. La Niña was observed in 1996-1997.
- December 2007. Severe storms, winds, mudslides, landslides, and flooding occurred between December 1 and 17, 2007 shutting down roads and highways including Interstate 5. Public infrastructure, homes, and personal property were damaged. In Oregon, 73,000 residents were without power, and wastewater treatment plants were overwhelmed. A major disaster was declared for the State of Oregon on December 8, 2007 with Yamhill County included in the declaration (FEMA 2008). Yamhill County suffered the loss of the south approach fill at Ayers Creek Bridge on North Valley Road.
- March 2008 FEMA statewide disaster aid was estimated at approximately \$20 million as follows:
  - ❖ \$6,051,729 in individual assistance approved
  - ❖ \$10,957,500 in low-interest disaster loan assistance approved to homeowners, renters, and businesses of all sizes
  - ❖ \$3,157,918 in public assistance obligated
  - ❖ 3,569 individuals registered for assistance
  - ❖ 3,864 individuals visited Disaster Recovery Centers
  - ❖ 2,014 home inspections completed
- January 2009. Heavy rains on New Year's Eve caused the South Yamhill River to crest to 16 feet, a level not seen since 1964. The Governor declared Yamhill County and several other Oregon counties in a state of emergency. Major roads throughout the county were closed because of flooding or adjacent high river waters. Street runoff caused flooding issues at many residences including cutting off access to homes and inundation of crawl spaces. Damage to about 24 homes caused residents to evacuate.
- January 17-21, 2012. Heavy rains and snow melt caused water bodies throughout Yamhill County to flood. The Yamhill River crested at 55 feet, four feet above

flood level causing highway and local road closures, the closure of the Wheatland Ferry across the Willamette River, water damage & flooding to homes, and farmland flooding. Water infrastructure and supply was also compromised including clogged storm drains, overwhelmed wastewater treatment facilities and water loss after a pond edge gave way. Schools and college campuses closed early and cancelled classes.

- January 2014. Heavy rains caused flooding throughout Yamhill County. Impacts were similar to impacts of the January 2012 storms.

### 4.5.4.3 Location

Yamhill County is in the Willamette River basin in northwestern Willamette Valley. It lies east of the Coast Range and west of the Cascade Mountain Range. Weather patterns generally move west to east where air masses from the Pacific Ocean rise over the Coast Range, cool, and become saturated. The Coast and Cascade ranges buffer the Willamette Valley from continental air moving westward (Yamhill County Emergency Management 2006).

Yamhill County is subject to flooding from overflowing rivers (Willamette, North Yamhill, and South Yamhill) and smaller tributaries (Ayers, Panther, Turner, Haskins, Fairchild, Mill, Willamina, Rock, and Agency creeks), and flooding from local storm water drainage. Between October and April the county is susceptible to winter rain flooding, while between May and July, snowmelt and runoff can create floods. Typically, the most severe floods are winter rainfall floods in December, January, and February.

Figures A-3 through A-3J show the location of the 100 and 500-year floodplain in the county and each participating jurisdiction.

### 4.5.4.4 Extent

Floods can result in loss of life and property, with the extent of the damage dependent on the depth and velocity of the floodwaters. Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. Flood studies often use historical records, such as streamflow gauges, to determine the probability of occurrence for floods of different magnitudes.

FEMA has mapped most of the flood-prone streams in Oregon for 100- and 500-year flood events. A 100-year flood (a flood with a 1-percent probability of occurring within any given year) is used as the standard for floodplain management in the United States and is referred to as a base flood. Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide the most readily available source of information for 100-year floods. These maps are used to support the NFIP. FIRMs delineate 100- and 500-year (a flood with a 0.2-percent probability of occurring within any given year) floodplain boundaries for identified flood hazards; these areas are Special Flood Hazard Areas (SFHAs) and provide the basis for flood insurance and floodplain management requirements. These maps represent a snapshot in time, and do not account for later changes which occurred in

## Hazard Profiles

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the floodplains. Development and other natural and artificial changes in the floodplain have caused changes to the rivers and streams in Yamhill County.

<sup>1</sup>FIRM = Flood Insurance Rate Map. The last effective date for these maps was 2010.

<sup>1</sup>FIRM = Flood Insurance Rate Map. The last effective date for these maps was 2010.

For Yamhill County, there are 78 FIRMs for cities and communities in the unincorporated portions of the county. Major SFHAs identified within Yamhill County include to following:

DRAFT



**Table 4-7 Yamhill County Flood Insurance Rate Maps**

**Hazard Profiles**

Flood Source	FIRM <sup>1</sup>
Willamette River	41071C 0630 D, 41071C 0635 D, 41071C 0655 D, 41071C 445 D, 41071C 435 D, 41071C 455 D, 41071C 0219 D, 41071C 0238 D, 41071C 0239 D, 41071C 0236 D, 41071C 0237 D, 41071C 245 D, 41071C 0265 D
North Yamhill River	41071C 0025 D, 41071C 0050 D, 41071C 0150 D, 41071C 0175 D, 41071C 0176 D, 41071C 0178D, 41071C 0179D, 41071C 0187 D, 41071C 0191 D, 41071C 0190 D, 41071C 0195 D, 41071C 0406 D, 41071C 0407 D
South Yamhill River	41071C 0395 D, 41071C 0415 D, 41071C 0510 D, 41071C 0530 D, 41071C 0552 D, 41071C 0553 D, 41071C 0554 D, 41071C 0556 D, 41071C 0557 D, 41071C 0558 D, 41071C 0559 D, 41071C 0580 D, 41071C 0585 D
Yamhill River	41071C 0426 D, 41071C 0427 D, 41071C 0429 D, 41071C 0435 D, 41071C 0455 D
Panther Creek	41071C 0175 D, 41071C 0190 D, 41071C 0195 D, 41071C 0402 D, 41071C 0406 D
Willamina Creek	41071C 150 D, 41071C 350 D, 41071C 375 D, 41071C 532 D, 41071C 535 D, 41071C 551 D, 41071C 553 D
Agency Creek	41071C 0325 D, 41071C 0510 D, 41071C 0530 D
Salt Creek (south)	41071C 0585 D, 41071C 0605 D, 41071C 0602 D, 41071C 0414 D, 41071C 0415 D
Ash Swale	41071C 0605 D, 41071C 0602 D, 41071C 0610 D
Palmer Creek	41071C 0610 D, 41071C 630 D, 41071C 0440 D, 41071C 0429 D
W. Fork Palmer Creek	41071C 0420 D, 41071C 440 D, 41071C 0428 D, 41071C 429 D
Hess Creek	41071C 0225 D, 41071C 0229 D, 41071C 0219 D, 41071C 0238 D, 41071C 0236 D, 41071C 0237 D, 41071C 0239 D,
Chehalem Creek	41071C 0182 D, 41071C 0225 D, 41071C 0208 D, 41071C 0209 D, 41071C 0217 D, 41071C 0236 D, 41071C 0237 D, 41071C 0238 D
Yamhill Creek	41071C 0075 D, 41071C 0179 D, 41071C 0181 D, 41071C 0183 D
Puddy Gulch	41071C 0175 D, 41071C 0178 D, 41071C 0179 D
Salt Creek (north)	41071C 0075 D, 41071C 0178 D, 41071C 0177 D, 41071C 0176 D
Baker Creek	41071C 0150 D, 41071C 0175 D, 41071C 0400 D, 41071C 0401 D, 41071C 0402 D, 41071C 0406 D
Cozine Creek	41071C 0400 D, 41071C 0403 D, 41071C 0404 D

An area totaling 66.2 square miles within the county is within the 100-year floodplain and an additional 3.5 square miles are within the 500-year floodplain. The 500-year floodplain generally encompasses slightly more area than a 100-year event. Each watershed has its own water absorption characteristics. Buildings, roads, and parks replace grass and soil limiting water absorption. Therefore, 500-year events contain more water, which spreads further throughout the floodplain until the water can be managed by manmade and natural drainage systems.

Historic data indicates flood depths exceeding flood levels by one foot on the Willamette River (crested at 29 feet) and levels by five feet on the South Yamhill River (crested at 55 feet).

The updated FEMA FIRMs provide a comprehensive analysis of the 100- and 500-year floodplains. The maps cover the entire geographic extent of Yamhill County and therefore include small waterways, reservoirs and less densely populated areas that were not included in previous editions of the FIRMs.

### 4.5.4.5 Probability of Future Events

Yamhill County is rated as having an above average flood risk (State of Oregon 2008). Communities in Yamhill County participating in the NFIP are required to regulate floodplain development. Any structure built in the floodplain after 1974 has to meet NFIP requirements for elevation and flood proofing.

Flood studies use this information to determine the probability of flood occurrence of different magnitudes. The probability of occurrence is expressed as a percentage indicating the probability of a specific flood event occurring in any given year.

Factors contributing to the frequency and severity of riverine flooding include:

- Rainfall intensity and duration
- Antecedent moisture conditions
- Watershed conditions, including steepness of terrain, soil types, amount and type of vegetation, and density of development
- The existence of attenuating features in the watershed, including natural features such as swamps and lakes, and human-built features such as dams
- The existence of flood control features, such as levees and flood control channels
- Velocity of flow
- Tide heights and storm surge
- Availability of sediment for transport, and the erodibility of the bed and banks of the watercourse

These factors are evaluated using a hydrologic analysis to determine the probability that discharge of a certain size will occur, and to determine the characteristics and depth of the flood resulting from that discharge.

Yamhill County has a wide range of climate and elevations with average monthly precipitation ranging from approximately fourteen inches in the highest elevations to five inches in lower elevations. Floods are most common in Yamhill County from October through April when storms from the Pacific Ocean bring intense rainfall (Yamhill County Emergency Management 2006). Based on previous occurrences, flood events are likely to occur around the county every one to ten years.

### 4.5.5 Participation in NFIP

Properties in and near the floodplains in Yamhill County and its cities are subject to frequent flooding events. Since flooding is such a pervasive problem throughout the city, many residents maintain flood insurance policies to help recover from losses incurred from flooding events. While there are 5,760 parcels located within the mapped SFHA, there are only 714 insurance policies in force. However, these numbers do not represent the number of structures in the SFHA; GIS analysts at the Department of Land Conservation and Development estimate the number of structures in Yamhill County sited in the SFHA to be fewer than 1000.

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Flood insurance covers only the improved land, or the actual building structure. Repetitive loss structures are defined as a National Flood Insurance Program (NFIP)-insured structure that has had at least two paid flood losses of more than \$1,000 each in any 10-year period since 1978<sup>3</sup>. Repetitive loss structures are troublesome because they continue to expose lives and valuable property to the flooding hazard. Local governments as well as federal agencies such as FEMA attempt to address losses through floodplain insurance and attempts to remove the risk from repetitive loss of properties through projects such as acquiring land and improvements, relocating homes or elevating structures. Continued repetitive loss claims from flood events lead to an increased amount of damage caused by floods, higher insurance rates, and contribute to the rising cost of taxpayer funded disaster relief for flood victims.<sup>4</sup>

Yamhill County's Flood Insurance Rate Maps are current as of 2010, although the underlying modeling dates back to 1974.<sup>5</sup> Table 4-8 shows that as of May 8, 2014, Yamhill County and its incorporated cities have 744 National Flood Insurance Program (NFIP) policies in force representing \$103,297,385 in coverage. FEMA records show a total of 78 paid losses totaling \$1,105,634 with the majority of paid losses in the City of Sheridan (46).

Table 4-8 NFIP Summary Data

Jurisdiction	Status of Firm	Number of NFIP Policies	Claims	Last CAV*	CRS^ Rating
Amity	2-Mar-10	10	0	--	--
Carlton	2-Mar-10	0	0	--	--
Dayton	2-Mar-10	5	0	--	--
Dundee	2-Mar-10	4	2	--	--
Lafayette	2-Mar-10	1	0	--	--
McMinnville	2-Mar-10	31	1	--	--
Newberg	2-Mar-10	6	0	--	--

<sup>3</sup> Federal Emergency Management Agency. Definitions, available online at <http://www.fema.gov/business/nfip/19def2.shtm#R>

<sup>4</sup> National Flood Insurance Program. Available on the World Wide Web <http://www.fema.gov/nfip>. Accessed April 2002.

<sup>5</sup> Federal Emergency Management Agency. Federal Emergency Management Agency Community Status Book Report. <http://www.fema.gov/cis/OR.html>

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Sheridan	2-Mar-10	513	46	Sept-09	8
Willamina	2-Mar-10	6	5	--	--
Yamhill County	2-Mar-10	166	23	--	--
Yamhill	2-Mar-10	2	1	--	--

Source: Oregon Floodplain Coordinator, May 8, 2014

\*Community Assistance Visit

^Community Rating System

The Community Repetitive Loss record for Yamhill County and its jurisdictions identifies four repetitive loss buildings (2 on County land, 1 in Sheridan, and 1 in Willamina) and four total (two insured) repetitive loss claims.<sup>6</sup> Both of the identified repetitive flood loss (RFL) properties are located in Zone X; although FEMA records erroneously identify one of these properties as being in an AE zone on the NFIP map.<sup>7</sup> Substantially damaged buildings located in the Special Flood Hazard Area do not require benefit-cost analysis to qualify for mitigation funds.

### 4.5.6 Landslide

#### 4.5.6.1 Nature

Landslide is a general term for the dislodgment and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rockfalls, rockslides, debris avalanches, debris slides and slump-earth flows. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation and weather.

Landslides can be triggered by natural events such as seismic tremors and earthquakes, volcanic eruptions, stream erosion, snowmelt, and prolonged or heavy rainfall. Development and other human activities can also provoke landslides. Increased runoff, excavation in hillsides, shocks and vibrations from construction, placement of non-engineered fill, and changes in vegetation from fire, timber harvesting and land clearing have all led to landslide events. Weathering and decomposition of geologic material, and alterations in flow of surface or ground water can further increase the potential for landslides.

<sup>6</sup> FEMA Community Information System records provided by the Oregon Floodplain Coordinator on August 3, 2012.

<sup>7</sup> The parcel is more likely located in an X-500 zone according to the Oregon State Floodplain Coordinator

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The United States Geological Survey (USGS) identifies six types of landslides, distinguished by the type of material and movement mechanism involved:

- **Slides:** The more accurate and restrictive use of the term landslide refers to a mass movement of material, originating from a discrete area of weakness that slides from stable underlying material. A *rotational slide* occurs when there is movement along a concave surface; and a *translational slide* originates from movement along a flat surface.
- **Debris flows:** Flows arise from saturated material that generally moves rapidly down a slope. A debris flow usually mobilizes from other types of landslides on steep slopes, then flows through confined channels, liquefying and gaining speed. Debris flows can travel at speeds of more than 35 miles per hour for several miles. Other types of flows include debris avalanches, mudflows, creeps, earth flows, debris flows, and lahars.
- **Lateral Spreads:** This type of landslide generally occurs on gentle slopes or flat terrain. Lateral spreads are characterized by liquefaction of fine-grained soils. The event is typically triggered by an earthquake or human-caused rapid ground motion.
- **Falls:** Falls are the free-fall movement of rocks and boulders detached from steep slopes or cliffs.
- **Topples:** Topples are rocks and boulders that rotate forward and may become falls.
- **Complex:** Any combination of landslide types.

The likelihood of a landslide in any given slide-prone location is largely dependent on the water content of the soil or rock fill. Landslides may happen at any time of the year, especially during rainy months when soils become saturated with water. Earthquakes can add to slope stress and disrupt ground stability, thereby triggering landslides, usually in already slide-prone locations. In addition, unconsolidated deposits of alluvial and glacial outwash materials are subject to accelerated stream bank erosion and landslides.

Indicators of a possible landslide include:

- springs, seeps, or wet ground that is not typically wet;
- new cracks or bulges in the ground or pavement;
- soil subsiding from a foundation;
- secondary structures (decks, patios) tilting or moving away from main structures;
- broken water line or other underground utility;
- leaning structures that were previously straight;
- offset fence lines;
- sunken or dropped-down road beds;
- rapid increase in stream levels, sometimes with increased turbidity;

- rapid decrease in stream levels even though it is raining or has recently stopped; and
- sticking doors and windows, visible spaces indicating frames out of plumb.

Landslides often occur in conjunction with other natural hazards, thereby exacerbating conditions, as described below:

- Shaking due to earthquakes can trigger events ranging from rockfalls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Landslides into a reservoir can indirectly compromise dam safety, and a landslide can even affect the dam itself.
- Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential.

### 4.5.6.2 History

Oregon Department of Geology and Mineral Industries (DOGAMI) reports few landslides in Willamette Valley, however, southern Yamhill County and the edges of the valley are susceptible because of the occurrence of marine sedimentary rock and clay-rich residual soils overlying basalts. Yamhill County does not have a comprehensive list of landslide events, but they likely occur during major storms in western Oregon. Major landslides were reported in 1964, 1966, 1982, and 1996 during storms. Two winter storms in November 1996 triggered over 9,500 landslides and debris flows on logged and un-logged land mostly in the Cascade and Oregon Coast mountain ranges.

A severe storm in December 2008 resulted in record and near-record snow, mudslides, and landslides and a disaster declaration for Yamhill County.

In March of 2012 in Sheridan there was a water break on the Stoney Mountain Transmission Line caused by a 200ø300ø landslide on a hill located between Canyon Road and Richard Street. In 2014, landslides in Buck Hollow (near Willamina) partly closed adjacent roads.

### 4.5.6.3 Location

In Yamhill County, DOGAMI reports the slopes nearest to the Willamette River, in the western portion of the Salem Hills, are at greatest risk of landslides. Weak, low-permeability marine sediments overlain by basalts, and clay rich residual soils overlying basalts are susceptible to water-induced landslides on steep slopes and within existing slide masses. Features such as hummocky topography, disrupted drainage patterns, sag ponds, springs, back-tilted bedrock blocks, and subdued head scarps are indicative of landslide terrain.

Figure 1 shows historical landslide areas included in the DOGAMI's Statewide Landslide Information Layer for Oregon. Although most landslide areas are found in less populated

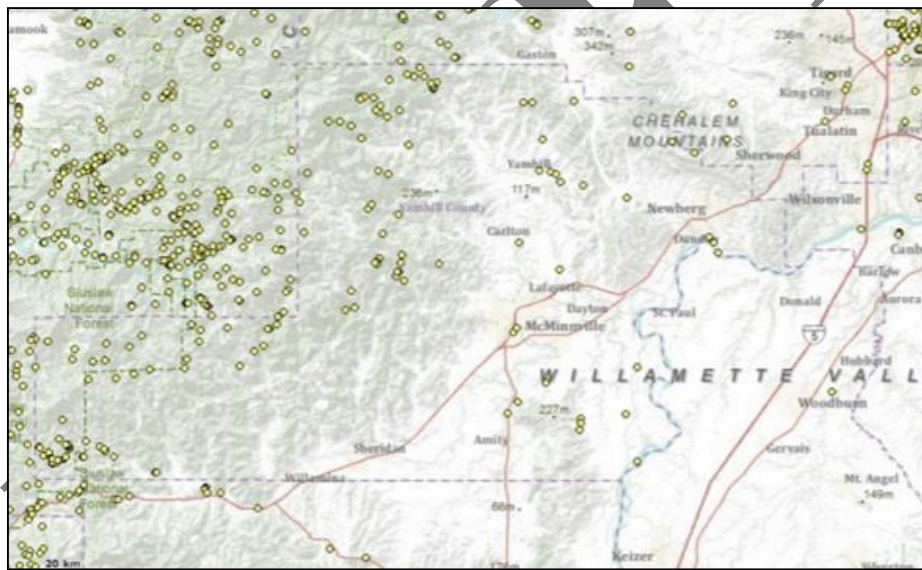
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western hills of Yamhill County, historic landslide areas are also present in or adjacent to urban areas. These areas include:

- Two sites in McMinnville: one at the southern end of SE Evans Street, just south of downtown and the second just north of the Linfield College campus;
- One site at the intersection of Hwy 99 and 233 just north of Amity;
- Four sites east of the City of Yamhill on NE Hwy 240
- One just east of the outlet to the Hickory Hill Farm Reservoir and on NE Hwy 240, west of Newberg;
- And three sites east of Dundee on the Yamhill County side of the Willamette River.

Landslides in these areas could cause disruptions in transportation and potable water systems.

**Figure 1- Yamhill County SLIDO Map**



Source: from <http://www.oregongeology.org/slido/index.html>

Excavation and grading on sloping terrain and the addition of fill on slopes can increase the risk of landslides by affecting slope stability and angle. Alteration of drainage patterns causing water to flow over landslide prone slopes can trigger landslides. Likewise, broken pipes, leaking water or sewer lines, water retention facilities, irrigation, alterations to stream channels, stormwater management, increases in impervious surfaces and runoff can also increase landslide potential. Vegetation removal from steep slopes increases landslide potential. The Oregon Department of Forestry analyzed the storm impacts and landslides of 1996 and determined landslides increased during the ten years following

timber harvesting. Developments adjacent to the base of steep slopes, in confined stream channels (canyons), or on fans (rises) at stream channel mouths can be impacted by landslides. Excavating steep slopes, developing on gentle slopes, and on or adjacent to existing landslide prone areas can also put development sites at risk. Natural conditions such as rainfall, volcanic eruptions, or earthquakes can trigger landslides. Figures A-4 through A-4I shows the landslide hazard areas.

The steering committee also identified the following localized areas of concern in regards to landslides throughout Yamhill County that have not yet resulted in disaster conditions. These areas are included in the following:

- Yamhill City: The hillside on Turner Creek is slowly sliding toward the creek. This area is above the water plant and has the potential to someday block the creek.
- Yamhill County: Laughlin Road may be blocked by potential landslides.
- Newberg: The Willamette River and springs upon surrounding hillsides have the potential for debris flow.

#### 4.5.6.4 Extent

The Oregon Department of Forestry (ODF) conducted a 3-year study of the impacts of landslides for two 1996 winter storms, entitled, *Storm Impacts and Landslides of 1996: Final Report*. This study concluded that the highest hazard for shallow rapid landslides in western Oregon occurs on slopes of over 70% to 80% steepness (depending on landform and geology).

The geographic extent of a landslide event is essentially the same as slide location, while the effects depend on what infrastructure is in the way of a slide, as well as the magnitude and force of the slide itself. The extent of effects could be as limited as one building or property, to region-wide effects, as in the case of a major transportation disruption, slide-induced dam failure, or utility outage.

Rapidly moving landslides have the greatest potential to endanger human life or inflict serious injury, especially to those living in or traveling through rapidly moving slide prone areas. Slow moving slides are less likely to inflict serious human injuries, but can cause property damage.

#### 4.5.6.5 Probability of Future Events

Some landslide activity can be expected annually during the rainy months, October through April. Previously saturated soils are prone to debris flows during periods of intense rainfall. Even though major property damage and other significant impacts from past landslide events have not been recorded for Yamhill County, it is important to map potential landslide and debris flow areas to prevent future losses.

In general, the probability of slope failure increases with an increase in slope inclination. However, this is not always the case. Depending on various factors such as soil or rock type, water content, vegetative cover, slope aspect, permeability and rate of infiltration, proximity to seismic sources, magnitude of seismic events, and potential vertical and



horizontal accelerations, a slope having a relatively low inclination could be at greater risk of failure than a slope having a relatively high inclination.

Landslides in western Oregon are generally a result of intense or prolonged rainfall, particularly during a rain on snow event. As such, based on previous occurrences, future widespread activity can be expected every 20 years and possibly more often depending on rain and storm events.

### 4.5.7 Volcano

#### 4.5.7.1 Nature

A volcano is a vent or opening in the earth's crust from which molten lava (magma), pyroclastic materials, and volcanic gases are expelled onto the surface. Volcanoes and other volcanic phenomena can unleash cataclysmic destructive power greater than nuclear bombs, and can pose serious hazards if they occur in populated and/or cultivated regions. Ashfall, and tephra, an eruptive hazard, are of the greatest concern in Yamhill County.

There are four general types of volcanoes found within a short distance of Yamhill County:

- **Lava domes** are domes that are formed when lava erupts and accumulates near the vent.
- **Cinder cones** are cone-shaped and formed by accumulation of cinders, ash, and other fragmented materials originating from an eruption.
- **Shield volcanoes** are broad, gently sloping volcanic cones of flat domical shape, usually several tens or hundreds of square miles in extent, built chiefly of overlapping and interfingering basaltic lava flows.
- **Composite or stratovolcanoes** are typically steep-sided, symmetrical cones of large dimensions built of alternating layers of lava flows, volcanic ash, cinders, and blocks. Most composite volcanoes have a crater at the summit containing a central vent or clustered group of vents.

Along with the different kinds of volcanoes, there are different types of eruptions. Eruption type is a major determinant of the physical results it creates and the hazards it poses. Six main types of volcano hazards exist:

- **Volcanic gases** are made up of water vapor (steam), carbon dioxide, ammonia, as well as sulfur, chlorine, fluorine, boron, and several other compounds. Wind is the primary source of dispersion for volcanic gases. Life, health, and property can be endangered from volcanic gases within about six miles of a volcano. Acids, ammonia, and other compounds present in volcanic gases can damage eyes and respiratory systems, and heavier-than-air gases, such as carbon dioxide, can accumulate in closed depressions and suffocate humans and animals.
- **Lahars** are formed when loose masses of unconsolidated, wet debris become mobilized, and are usually created by shield volcanoes and stratovolcanoes.

Eruptions may trigger one or more lahar directly by quickly melting snow and ice on a volcano or ejecting water from a crater lake. More often, lahars are formed by intense rainfall during or after an eruption. Rainwater can easily erode loose volcanic rock and soil on hillsides and in river valleys. As a lahar moves farther away from a volcano, it will eventually begin to lose its heavy load of sediment and decrease in size.

- **Landslides** are common on stratovolcanoes because their massive cones typically rise thousands of feet above the surrounding terrain, and are often weakened by the very process that created the mountain—the rise and eruption of molten rock (magma). If the moving rock debris is large enough and contains a large content of water and soil material, the landslide may transform into a lahar and flow more than 50 miles from the volcano.
- **Lava flows** are streams of molten rock that erupt from a vent and move down slope. Lava flows destroy everything in their path. However, deaths caused directly by lava flows are uncommon because most move slowly, and flows usually do not travel far from the source vent. Lava flows can bury homes and agricultural land under hardened rock, obscuring landmarks and property lines.
- **Pyroclastic flows** are dense mixtures of hot, dry rock fragments and gases that can reach 50 miles per hour (mph). Most pyroclastic flows include a ground flow composed of coarse fragments and an ash cloud that can travel by wind. Escape from a pyroclastic flow is unlikely because of the speed at which they move.
- **Tephra** is a term describing any size of volcanic rock or lava that is expelled from a volcano during an eruption. Large fragments generally fall back close to the erupting vent, while particles of ash can be carried hundreds to thousands of miles away from the source by wind. Ash clouds are common adaptations of tephra.

### 4.5.7.2 History

Cascade volcanoes that have erupted during the past 4,000 years include Mount Baker, Mount Rainier, Mount St. Helens, Mount Adams, Mount Hood, Three Sisters, Newberry Volcano, Mount Mazama (Crater Lake), Medicine Lake Volcano, Mount Shasta, and Lassen Peak (Figure A-11).

The closest volcanoes to Yamhill County are Mount St. Helens, Mount Jefferson and Mount Hood, all to the east.

Mount St. Helens has been the most active volcano in the Cascade Range during the past 10,000 years. In Oregon, awareness of the potential for volcanic eruptions was greatly increased by the May 18, 1980 eruption of nearby Mount St. Helens in Washington which killed 57 people. The upper portion of the summit collapsed in a massive landslide triggered by volcanic tremors. That portion of the mountain is now a horseshoe-shaped crater partially filled by a lava dome. Early 19<sup>th</sup> Century settlers in the region witnessed eruptions occurring along the north flank area of the mountain.

As a result of the 1980 eruption and the far-reaching extent of the lateral blast, damage and reconstruction exceeded \$1 billion. The coverage area was 230 square miles and

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reached 17 miles northwest of the crater. Impacts from pyroclastic flows covered six square miles and reached 5 miles north of the crater, and landslides covered 23 square miles. Lahars (mudflows) affected the North and South Forks of the Toutle River, the Green River, and ultimately the Columbia River as far as 70 miles from the volcano. Mount St Helens' most recent eruption began in October of 2004, with initial steam and ash eruptions giving way to slow-moving lava flows which ceased in January of 2008. Mount Hood erupted in approximately 1805. Two other minor eruption periods occurred during the last 500 years with some lava flow near the summit. The eruptions created pyroclastic flows and lahars with little ash fall (State Interagency Hazard Mitigation Team 2006). The other volcanoes in the Pacific Northwest have undergone similar formation and eruption cycles.

Mount Jefferson last erupted about 15,000 years ago. Research of other stratovolcanoes suggest that Mount Jefferson should be considered dormant, not extinct. A major eruption could generate pyroclastic flows and lahars, and an explosive eruption could spew ash for hundreds of miles downwind. The volcano has steep slopes and debris flows would likely be contained in within 10 miles of the surrounding valley.

### 4.5.7.3 Location

The extensive north-south oriented chain of volcanoes known as the Cascadia volcanic arc, or Cascade Range, were formed by the Cascadia subduction zone. As the seafloor plate sinks beneath the North American Plate, it heats up and begins to melt, providing a vast reservoir of the heat and molten rock that create the magma chambers that become volcanoes.

Three closest three volcanoes to Yamhill County, Mount St. Helens, Mount Hood, and Mount Jefferson, all lie to the east.

- **Mount St. Helens**, a stratovolcano, is located approximately 50 miles northeast of Portland in Skamania County and has an elevation of 9,677 feet. Access is provided from the west in Cowlitz County by State Route 504 about 34 miles west of Interstate Highway 34 (USGS 2008).
- **Mount Hood** is located approximately 47 miles east-southeast of Portland and is the most accessible of Oregon's volcanoes. Access to the volcano is provided by US Highway 26 from the south and Oregon Highway 35 from the east side. Other paved roads provide further access to this most often climbed peak in the Pacific Northwest. A hiking trail circles the volcano. In the winter, the mountain hosts downhill and cross country skiing. At 11,239 feet, Mount Hood is the highest peak in the state and is part of the Mount Hood National Forest (USGS 2008).
- **Mount Jefferson** is located in the Mount Jefferson Wilderness area and the Warm Springs Indian Reservation approximately 70 miles from Portland, and 50 miles from Bend, Oregon. Access is provided by Highway 22 east of Salem and US Forest Service roads and trails lead into the wilderness area (USGS 2008).

### 4.5.7.4 Extent

Mount St. Helens, a stratovolcano, is believed to be the volcano with the greatest potential to have a near-term impact on the region because of its ongoing activity since the cataclysmic event in May 1980. A large eruption of Mount St. Helens can eject tephra to altitudes of 12 to 20 miles and to deposit tephra over an area of 40,000 square miles or more. Wind direction and velocity, along with the vigor and duration of the eruption, will control the location, size, and shape of the area affected by tephra fall. Another eruption from Mount St. Helens is likely in the near future.

Mount St. Helens most recently erupted in October of 2004, pushing ash more than 10,000 ft into the air, and lava flows continued until January, 2008, after which activity ceased. The volcano has been recently downgraded to inactive, although another eruption in the near future is highly likely. Due to proximity, the major hazard for Yamhill County would be impacts from ash (i.e., minor ash falls from eruptions from Mount St. Helens (or lesser ash falls from more distant volcanoes). Prevailing wind is a factor in how much ash is disbursed among communities within Yamhill County. Volcanic eruptions may impact water bodies. River valleys are susceptible to debris flows, landslides, and lahars; this may require dredging to maintain channel depths for navigation.

Buildings, streets, and roads throughout the entire county would require minor cleanup with negligible impacts. Temporary utility interruptions are likely, and minor cleanup may be required for electrical and other utility services. Water treatment facilities may require additional attention to address high turbidity water. Injuries associated with respiratory problems may result (Goettel 2005).

### 4.5.7.5 Probability of Future Events

Yamhill County has a low risk of experiencing damage from a volcano. Ashfall is of greatest concern in the county. The USGS estimates there is annual probability of 0.01 percent that 10 centimeters or more of tephra (ash) accumulation will occur in the far west portions of Yamhill County. Most of the county has less than 0.01 percent probability of ash fall impact. Ashfall deposition is controlled by prevailing wind direction, which in the Cascades is predominately from the west. During previous eruptions, ash fall has drifted to the east of the volcanoes.

By careful analysis of past activity, geologists can make general forecasts of long-term activity associated with individual volcanoes, but these are on the order of trends and likelihood, rather than specific events or timeline. Short-range forecasts are often possible with greater accuracy. Several signs of increasing activity can indicate that an eruption will follow within weeks or months. Magma moving upward into a volcano often causes a significant increase in small, localized earthquakes, and increased emissions of carbon dioxide and compounds of sulfur and chlorine that can be measured. Shifts in magma depth and location can cause changes in ground level elevation that can be detected through ground instrumentation or remote sensing.

The USGS has identified several other potentially active volcanoes in Washington, Oregon, and California. The effects of volcanic activity from these volcanoes could

include landslide avalanches, lahars, tephra, lava, and pyroclastic flows or surges. Activity from one of these volcanoes is highly likely in the near future.

### 4.5.8 Wildfires

#### 4.5.8.1 Nature

Wildfires can be classified as wildland fires, wildland/urban interface (or intermix) fires, urban fires, and prescribed fires. Both wildland fires and wildland/urban interface fires may occur in Yamhill County.

Wildland fires spread through the consumption of vegetation. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke that may be visible for miles around. Wildland fires can be caused by human activities such as arson or campfires, or by natural events like lightning. Wildland fires often occur in forests or other areas with ample vegetation. When a wildland fire spreads to developed areas such as suburbs, small communities, or isolated homes, it becomes a wildland/urban interface fire.

The following three factors contribute appreciably to wildland fire behavior and can be used to identify hazards.

- **Topography:** As slope increases, the rate of wildfire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridgetops can mark the end of a wildfire's spread, since fire spreads more slowly or may even be unable to spread downhill.
- **Fuel:** The type and condition of vegetation plays a significant role in the occurrence and spread of wildfires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The moisture content of both living and dead plant matter decreases during periods of prolonged drought and greatly increases the risk of fire. The fuel's continuity, both horizontally and vertically, is also an important factor. Forests with strong ladder fuels (understory growth between ground fuels and tree crowns) are more likely to have major fires involving tree crowns. Forests with limited ground fuels and little or no ladder fuels are much more likely to experience minor ground fires than a fire involving tree crowns.
- **Weather:** The most variable factor affecting wildfire behavior is weather. Temperature, humidity, wind and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures coupled with low humidity, can lead to devastating wildfires. Conversely, cool temperatures and higher humidity often signal reduced wildfire occurrence and easier containment of existing fires.

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In Yamhill County, wildland fires burn primarily vegetative fuels, outside highly urbanized areas. Wildland fires can be categorized as occurring in the following locations:

- **Agricultural:** Agricultural fires burn in areas where the primary fuels are flammable cultivated crops, such as wheat. This type of fire tends to spread very rapidly, but is relatively easy to suppress if adequate resources are available. Structures threatened, if any, are generally those belonging to ranch and farm owners. There can also be significant losses in agricultural products.
- **Forest:** Forest fires are the classic wildland fire. These fires burn fuels composed primarily of timber and associated fuels, such as brush, grass, logging residue and thick stands of replanted trees. Due to variations in fuel and topography, this type of fire may be extremely difficult and costly to suppress.
- **Wildland-Urban Interface:** Fires involving the wildland-urban interface occur in areas where urbanization and the presence of natural vegetation fuels allow a fire to spread rapidly from natural fuels to structures and vice versa. Especially in the early stage of such fires, structural fire suppression resources can be quickly overwhelmed, increasing the number of structures destroyed. Such fires are known for the large number of structures simultaneously exposed to fire. Nationally, wildland interface fires commonly produce widespread losses.
- **Urban:** While fires in urban areas rarely spread out of control, thanks to proximity to fire-fighting resources and less fuel between buildings, urban conflagration is a hazard in densely populated areas. Many of the same factors that influence hazard in wildland and interface areas come into play in urban centers. Drought, high temperatures, and fuel load are joined by factors such as flammable building materials, aging electrical wiring, and closely packed structures to increase fire hazard. When combined with inadequate or faulty firefighting equipment, staff shortages, or poor location data, urban fire risk factors can set the stage for disaster.

Although thought of as a summer occurrence, wildland fires can, and do, occur during any month of the year. The vast majority of wildland fires occur between July and October. Dry spells during the winter months, especially when combined with the factors of winds or dead fuels, result in fires that burn with alarming intensity and rate of spread. Common causes of wildland fire include: lightning; equipment use; railroad activity; debris burning; arson; and improperly extinguished cigarettes.

Wildland fires are part of the natural ecology and natural life cycles of wildlands. Fires create open spaces with different habitats for both plants and animals than existed previously. Fires also reduce fuel loads in areas, which in turn decreases the potential for large catastrophic fires. However, a wildland fire may grow into an emergency or disaster if not promptly controlled. Even a small fire can threaten lives and resources and destroy property, especially in heavily developed interface areas. Wildland fires may also harm livestock and pets. In addition to threatening humans, animals, and infrastructure, wildfires in forested areas have a severe impact on natural resources. Wildland fires strip the land of vegetation and destroy forest resources. Soil exposed to

intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams, thus increasing flood potential, harming aquatic life and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards, as discussed in the landslides hazard profile.

### **4.5.8.2 History**

Wildland fires have burned the Oregon landscape for thousands of years. Many wildfires have resulted from natural lightning strikes and intentional human activities. In Yamhill County, the indigenous Che-ahm-ill people, a subgroup of the Kalapuyan culture, purposely ignited large portions of the basin valley annually for agriculture, hunting, communication, warfare, visibility, safety, and sanitation. The Kalapuyans occupied the Yamhill basin valley at the time of Euro-American contact, but such systemic burning may have been used for as long as ten thousand years prior to Euro-American settlement. Euro-American settlement in the mid-19<sup>th</sup> century continued to shape the landscape with fire. Euro-Americans burned land to protect timber and property in the region. Euro-Americans directed more attention to forested areas and coastland. As a result, valley prairies and savannas burned less and areas that were not used for fields or pastures began growing into forests.

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According to ODF, major wildfires have occurred in Oregon in the past 150 years, with several occurring in Yamhill County (Table 4-9).

**Table 4-9 Historic Fires in Oregon (1848-2011)**

Year	Name of Fire	Counties	Acres burned
1848	Nestucca	Tillamook/Yamhill	290,000
1849	Siletz	Lincoln/Polk	800,000
1853	Yaquina	Lincoln	482,000
1865	Silverton	Marion	988,000
1868	Coos Bay	Coos	296,000
1933	Tillamook	Tillamook/Yamhill	240,000
1936	Bandon	Coos	143,000
1939	Saddle Mountain	Tillamook/Yamhill	190,000
1945	Wilson River/Salmonberry	Tillamook	33,000
1951	North Fork & Elkhorn	Tillamook, Yamhill	33,000
1966	Oxbow	Lane	44,000
1987	Silver	Josephine	97,000
1992	Lone Pine	Klamath	31,000
1996	Skelton	Deschutes	17,700
2002	Biscuit	Josephine/Curry	500,000
2003	B&B Complex	Jefferson/Linn/Deschutes/Marion	80,000
2005	Blossom Complex	Curry	14,772
2006	Shake Table Complex	Grant	14,453
2007	Lovelett Creek	Grant	53,556
2007	Battle Creek Complex	Wallowa	79,299
2007	Irish Springs (Vale BLM)	Baker	45,743
2007	Egley Complex	Hamey	140,360
2008	Royce Butte	Deschutes/Klamath/Lane	390-1,100
2008	Summit Springs Complex	Deschutes/Jefferson	1,973
2009	Microwave	Hood River/Wasco	1,264
2009	South County Complex	Jackson	633
2010	D Harris	Wasco	3,800
2011	North River Road	Jackson	400
2011	Elk Fire	Jefferson	1,000
2011	High Cascades Complex	Jefferson	101,292

*Source: Oregon Department of Forestry, Oregon Office of the Fire Marshall, Oregon Emergency Management – 2012 State Hazard Risk Assessment*

The 1933 Tillamook valley fire ravaged nearly a quarter of a million acres and is thought to have caused several localized burns in the Willamina watershed.

As shown in Figure A-5, between 1962 and 2004, only two state-reported fires larger than 1,000 acres burned in the region.



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Table 4-10 shows recent fires, locations, and causes in Yamhill County.

**Table 4-10 Recent Large Fires in Yamhill County and Vicinity**

Year	Unit	Name	Fuel Model	Cause	Total Acres
1982	Forest Grove	82531066	Dense Brush	Equipment Use	5
1985	Dallas	85552210	Conifer, Second growth	Debris Burning	7
1986	Forest Grove	86531100	Conifer, Second growth	Debris Burning	5
1989	Forest Grove	89531019	Dense Brush	Debris Burning	58
1989	Dallas	89552234	Grass Perennial	Equipment Use	6
1990	Forest Grove	90531057	Conifer, Second growth	Debris Burning	6
1991	Dallas	91552211	Slash, heavy	Debris Burning	7
1993	Forest Grove	Oak Hill Rd. #2	Non wildland fuel	Equipment Use	6.5
1995	Forest Grove	SMITHVILLE ROAD FIRE	Grass Perennial	Miscellaneous	8.2
1999	Forest Grove	FOX RIDGE FIRE	Dense Brush	Debris Burning	47.8
2000	Forest Grove	Latham Road Fire	Dense Brush	Debris Burning	5
2001	Forest Grove	Old Soldier Road Fire	Grass Perennial	Equipment Use	5.7
2008	Yamhill County	NW Pike Road	Dense Brush	Equipment Use	5-6
2011	Sheridan	20351 Rock Creek Road	Grass Perennial	Miscellaneous	5

Yamhill County also has a growing history of wildland/urban interface fires. With suburban growth in the early 1970s, increasingly wildland fires in the area have affected or involved homes. In the 1990s, more than 100 structures burned in wildland fires and thousands more were threatened. Throughout the country, decades of strict fire suppression have resulted in thick overgrown forests that are highly vulnerable to even small fires in dry windy conditions.

In 2008 a total of 18 fires consumed 5.01 acres in Yamhill County. Causes included debris burning, equipment use, smoking, arson, and lightening.

### 4.5.8.3 Location

The Oregon Department of Forestry has developed a list of high-risk wildland fire communities. High-risk communities are defined as those that have at least 28 persons per square mile within 5 miles of a high-risk watershed. No communities within Yamhill County are included on this list.

However, as shown on Figures A-6 through A-6J, there are a few areas within the county that are at moderate and high risk for wildland fires. In general, steep, south-facing sloped forested areas are considered to be most at risk for wildland fires while flat, north-facing developed or wetland areas are considered to be at least risk for wildland fires. As such, the urbanized areas of Willamina, McMinnville, Dundee, and Newberg are at low risk for wildland fires. The evergreen and deciduous forests that border all sides of the county are at moderate risk for a wildland fire.

Furthermore, the 2001 Federal Register lists some Yamhill County communities at risk from wildfire damage. In Yamhill County, fire hazards are likely due to a lack of

firebreaks around buildings, limited water during summer months, and fire suppression practices over the last 100 years.

According to members of the 2014 steering committee the following areas are of particular concern for wildfire vulnerability: Farmland surrounding Newberg, Gerish Valley, and Turner Creek. Turner Creek is particularly important because it could restrict access or disrupt the power to the City of Yamhill's water plant on Turner creek or it could contaminate the water source for the plant.

#### **4.5.8.4 Extent**

The magnitude of wildfires is primarily dependent on severe drought coupled with lightning strikes and windy, stormy conditions, and the effects of wildfire suppression. For example, wildfire suppression has changed the vegetation of the Willamette Valley, which in turn has made some areas more susceptible to wild fires. The Willamette Valley was originally covered by lowland evergreen and deciduous forests and native prairie grasslands. Now there is more brush, small diameter trees, Douglas fir, and more crops, such as wheat, which can increase potential for wildfire damage.

Impacts of a wildland fire that interfaces with the population of Yamhill County could grow into an emergency or disaster if not properly controlled. A small fire can threaten lives and resources and destroy property. In addition to impacting human lives, wildland fires may severely impact livestock and pets. Such events may require emergency watering and feeding, evacuation and alternative shelter.

#### **4.5.8.5 Probability of Future Events**

In Oregon, wildland fire season normally begins in late June, peaks in August, and ends in October. However, a combination of above normal-temperatures and drought can increase the length of the traditional fire season. Wildland fires are not common in the Willamette Valley and based on historic events, large fires (1,000-acres) are only likely to occur every 20 years.

Urban fires are the most preventable type of fire, and future events depend largely on prevention measures. Although no historical urban conflagrations have occurred, educating residents, building and maintenance code enforcement, and firefighting equipment, staff, and response systems upkeep are all steps that can ensure that highly likely localized urban fires do not become large-scale conflagrations.

### **4.5.9 Wind**

#### **4.5.9.1 Nature**

Wind is air flow that travels horizontally with respect to the Earth's surface and topography. High winds are defined as those that last longer than one hour at greater than 39 miles per hour (mph) or for any length of time at greater than 57 mph. Wind speeds vary with individual storms. Windstorms often accompany snow, ice, and extreme cold temperature events during winter storms.

## Hazard Profiles

In general, the damaging effects of windstorms may extend for distances of 100 to 300 miles from the center of storm activity. Tornadoes are the most violent and destructive type of windstorm, usually caused by thunderstorms (Taylor et al. 1996). A tornado is a rotating column of air in contact with both a cloud base and the ground (AMS 2000). Wind speeds can vary between 40 to 400 mph leaving widespread destruction in their paths. While tornadoes are most common in the Midwest, they have occurred in Oregon. Oregon ranks 46<sup>th</sup> for frequency of tornados. Historically, Yamhill County has experienced six tornadoes and at least nineteen significant windstorms.

### 4.5.9.2 History

Numerous damaging windstorms have occurred within Yamhill County. Table 4-11, includes some of the most noteworthy that brought extensive damage to the region.

**Table 4-11 Windstorm Events, 1926 -2014**

Date	Sustained Wind Speed	Details
February 19, 1926		Tornado. Tree damage was reported.
April 1931	40 mph (75 mph gusts)	The wind caused multiple wildfires in the Willamette Valley, and dust clouds reduced visibility (Oregon Statesman. April 22, 1931).
November 10/11, 1951	40-50 mph (75-80 mph gusts)	Damage experienced statewide.
December 1951	60 mph (75 mph gusts)	Winds damaged buildings and utility lines statewide, four fatalities (Oregon Statesman. December 5, 1951).
December 1955	55-65 mph	In addition to extensive damage to buildings, power and telephone lines throughout the state, heavy destruction occurred in the Willamette Valley orchards.
November 1958	51 mph (71 mph gusts)	Fallen trees blocked highway access.
October 12, 1962	62 mph (90 mph wind gusts)	The Columbus Day storm was the equivalent of a Category IV hurricane in terms of central pressures and wind speeds. The storm, which started east of the Philippines as Typhoon Freda, measured 1,000 miles long as it hit the West Coast. The damage to Yamhill County was estimated to be over \$15 million. Extensive damage occurred to farm buildings and tree farms. Thirty-eight fatalities were recorded in Willamette Valley (News Register 1962).
March 1971	50 mph	Falling trees damaged homes and utilities. Most of the state was affected by the windstorm, but the worst damage occurred in Willamette Valley.
May 25, 1971	40-72 mph	Tornado. Limited damage (\$500-\$5000).
August 20, 1978		Tornado. Limited damage (\$5000-\$50,000).
November 13/14, 1981	52 mph (71 mph gusts)	Strongest windstorm since the Columbus Day storm. Widespread power outages and roof damage occurred. Eleven fatalities resulted from storm.

**Table 4-11 Windstorm Events, 1926 - 2014**

Date	Sustained Wind Speed	Details
April 18, 1984		Tornado. Limited damage (\$500-\$5000).
January 1990	75 mph	Damage experienced statewide, one fatality.
December 8, 1993	113-157 mph	Tornado. Considerable damage resulted (\$500,000-\$5 million).
December 12, 1995	62 mph	Very wet soil from an unusually rainy fall resulted in the toppling of many trees in the Willamette Valley. Three fatalities occurred, as well as over \$1 million in damages to the mid-Willamette Valley (Statesman Journal 1995).
November 1997	52 mph	Trees uprooted.
February 7 <sup>68</sup> , 2002	70 mph	Resulted in a Presidential declaration for coastal counties south of Polk and Yamhill counties.
January 2006	58 mph	Winds up to 58 mph caused a total of \$500k in Yamhill, Polk, Marion, Clackamas, Columbia, Washington, and Multnomah Counties.
February 2006	77 mph	Winds up to 77 mph caused \$277k in Linn Lane, Marion, Benton, Polk, and Yamhill Counties.
December 2007	52 mph	Heavy snowfall, rains, rapid temperature warming created widespread flooding, tree blockages, landslides, transportation and utility disruptions, and 5 deaths in Oregon. Statewide wind 50-100 mph \$180M damages.
June 2012 <sup>1</sup>	unknown	A windstorm passed through McMinnville damaging buildings and downing powerlines.
June 13, 2013 <sup>1</sup>	90 mph	An EF1 tornado touched down in McMinnville causing downed power lines, traffic disruptions due to debris in roadways, and building damage including severe damage to four buildings in McMinnville.
December 2013 <sup>1</sup>	unknown	High winds caused major damage to trees with falling limbs damaging a chain link fence and causing concerns for motorist and pedestrian safety in Yamhill City.
January 11-12, 2014 <sup>1</sup>	46 mph	Winds up to 46 mph along with heavy rains caused power outages for 1,300 McMinnville residents, tree limb damage, and
February 17, 2014 <sup>1</sup>	55 mph	A wind- and rainstorm caused tree damage and power outages throughout Oregon, leaving 1,200 without power in McMinnville. Elsewhere in the Portland area power outages led to 440,000 gallons of sewage to be released into the Willamette River.

Source: Taylor, George H., and Ray Hatton, The Oregon Weather Book (1999), pp.151-157

Hazard Mitigation Team Survey Report, Severe Windstorm in Western Oregon, February 7, 2002 (FEMA-1405-DR-OR) ONHW 2006

<sup>1</sup> Yamhill County Natural Hazard Mitigation Plan Steering Committee, February 26, 2014

### 4.5.9.3 Location

Yamhill County in the Willamette Valley is somewhat sheltered from strong westerly winds, as the north-south orientation of the Coast Range and Cascades obstructs and slows down these surface winds. The north-south orientation of the Willamette Valley often channels the winds in a north south direction. Winds blowing along a north to south axis, parallel to the major mountain ranges, can prove to be extremely destructive. Regardless of wind direction, prolonged windstorms are likely to last an average of three to six hours before moving on.

Most frequently, surface winds are from the southeast and are associated with storms moving in from the Pacific Ocean. Winds out of the south are generally more destructive. Chinook winds are strong easterly, warm, dry winds that come out of the Columbia River Gorge and can gust up to 100 mph. Chinook winds are caused by rapid atmospheric pressure changes. Prevailing winds vary with the seasons. Local topography plays a part in wind direction.

### 4.5.9.4 Extent

High winds are likely to occur during the months of October through April. Destructive windstorms are less frequent, but recent research has revealed a connection between the neutral years of the El Niño Southern Oscillation conditions and major Pacific Northwest windstorms. Generally, windstorms have a short duration and winds move in a straight line with gust exceeding 50 mph. Damaging winds can extend for 100 to 300 miles from the center of a storm. (State Interagency Hazard Mitigation Team 2006)

Tornados are characterized by wind speed and duration. Typically, they can last between several minutes to several hours, and can travel miles. The width of their paths varied between 10 feet and over one mile. The low-pressure centers bring sustained winds (40-60 mph) strong enough to topple power lines and trees.

### 4.5.9.5 Probability of Future Events

The risk of experiencing a windstorm in Yamhill County is low. There is four percent probability of experiencing a 25-year event with winds of 60 mph. There is a two percent annual probability of experiencing a 50-year event with winds of 67 mph, and a one percent annual probability of experiencing a 100-year event with winds of 75 mph (State Interagency Hazard Mitigation Team 2006).

Each winter, several Pacific low pressure centers make landfall in the northwest, bringing sustained winds strong enough (40-60 mph) to topple power lines and trees. Less frequently (one to two times every ten years), storms of considerably greater magnitude can produce winds gusting up to 70 mph or greater. The typical windstorm pattern in this area is a southwesterly flow as air heads directly into the Pacific Northwest.

The preliminary research shows that El Niño events tend to shear weather systems apart as they approach the Northwest and La Niña events tend to have periods with enhanced high pressure, thereby producing enhanced cool, northerly flows. The wind-producing intervening neutral years tend to occur every 3-7 years.

### 4.5.10 Winter Storm

Winter storms occurring in Yamhill County result in several natural hazards including floods, landslides/debris flows, snow, ice and wind. Each on its own, or in combination, can completely immobilize emergency response activities, close down transportation corridors, and disrupt transportation and utilities. Each of these natural hazards is individually discussed in detail in their respective sections.

Winter storms in Yamhill County can bring rain as well as snow, or can be followed by rising temperatures that melt newly fallen snow. Either scenario often causes flooding; most floods in western Oregon occur as a result of winter storms. The flood hazard is described in detail in flood section of this document.

As is the case with flood, wind as a hazard in Yamhill County most frequently occurs as part of a winter storm. The nature, history, location, extent, and probability of future events for wind, including winter storm wind, are explored in detail in the wind section of this plan.

#### 4.5.10.1 Nature

Ice and snow storms, which can include freezing rain, sleet, and hail, can be the most devastating of winter weather phenomena and are often the cause of automobile accidents, power outages and personal injury. Ice storms result in the accumulation of ice from freezing rain which coats every surface it falls on with a glaze of ice. Freezing rain is most commonly found in a narrow band on the cold side of a warm front, where surface temperatures are at or just below freezing. Typically, ice crystals high in the atmosphere grow by collecting water vapor molecules, which are sometimes supplied by evaporating cloud droplets. As the ice crystals fall, the air warms and the particles melt and collapse into raindrops. As the raindrops approach the ground, they encounter a layer of cold air and cool to temperatures below freezing. However, since the cold layer is shallow, the drops themselves do not freeze, but rather are super-cooled, that is cooled in a liquid state to below-freezing temperatures. These super-cooled raindrops freeze on contact when they strike the ground or other cold surfaces.

Snowstorms happen when a mass of very cold air collides with a mass of warm air. The warm air rises quickly and the cold air cuts underneath it, cooling and condensing as it rises, forming a cloud bank in the process. As the moisture droplets in the cloud cool to a point below freezing, they become ice crystals, which then collide within the cloud and snow is formed. The resulting precipitation falls as snow only when the temperature of the air between the bottom of the cloud and the ground is below 40 degrees Fahrenheit. A higher temperature will cause the snowflakes to melt as they fall through the air, turning them into rain or sleet. Similar to those of ice storms, the effects of a snowstorm can disturb a community for weeks or even months. The combination of heavy snowfall, high winds and cold temperatures poses danger from prolonged power outages, automobile accidents and transportation delays, dangerous walkways, and through direct damage to buildings, pipes, crops, other vegetation, and livestock. Buildings and trees can also collapse under the weight of heavy snow.

La Niña weather patterns can also increase the severity and frequency of winter storms. La Niña periods ensue when surface temperatures increase past the long-term average. Typical weather patterns throughout the Pacific Ocean are strengthened, yielding stormier than normal weather throughout the Pacific Northwest. Above average precipitation and colder temperatures are experienced across Oregon during these periods, with the potential for severe snowstorms increasing (Taylor 2008). These periods generally last longer than El Niño events, taking anywhere from one to three years to dissipate. La Niña periods tend to develop between March and June, and peak from December to April (NOAA 2005).

### 4.5.10.2 History

Table 4-12 summarizes the NOAA NWS Forecasts Offices past storm events website, which lists 12 significant ice and snow storms having occurred in Yamhill County from 1892-2008. Storms occurring after 2008 were sourced from the steering committee.

**Table 4-12 Ice and Snow Events, 1892 - 2014**

Date	Storm Type	Details
December 1892	Snow	Large amounts of snow fell across all of northern Oregon, with accumulation ranging from 15 to 30 inches.
December 1919	Snow	Third largest snowstorm in Oregon history, freezing the Columbia River.
January-February 1937	Snow	More than 26 inches of snow fell over a five-day period.
January 1950	Snow	A total 39 inches of snow fell in the Salem area during the month of January.
March 1960	Snow	Heaviest snowfall accumulation since 1950.
January 1963	Snow and Ice	Four inches of snow and large amounts of ice recorded.
January 1978	Snow and Ice	Heavy snowfall.
February 1989	Snow	Storm resulted in 5-feet of snow drifts and single digit temperatures.
February 1993	Snow	Storm dropped 12 inches of snow in 24 hours.
February 1996	Ice	Freezing rain fell for 2 days.
December 2003-January 2004	Winter Storm	Both Polk and Yamhill counties federally declared disaster areas as a result of freezing rain.
December 2006	Winter Storm	Both Polk and Yamhill counties federally declared disaster areas as a result of freezing rain.
December 2007	Winter Storm	Severe storms resulted in flooding, landslides, and mudslides beginning on December 1, 2007 resulted in a major disaster declaration requiring over 20 million in aid. Five counties in Oregon were included in this disaster.

## Hazard Profiles

December 20-26 2008	Snow, Mudslide, Landslide	A severe storm, record and near-record snow, mudslides, and landslides occurred between December 20 and 26, 2008. Said to be the worst snow and ice event to occur in the Willamette Valley in 40 years -- significantly damaged agricultural buildings and equipment. Heavy snow and freezing rain caused ice buildup that resulted in downed trees, limbs and broken branches throughout northwestern Oregon. Roads, infrastructure, and private property were damaged as a result of the storm. The full economic impacts of this storm event will not be known until spring, when the agricultural products potentially damaged by the event can be fully evaluated.
December 29, 2009 <sup>1</sup>	Winter Storm	An unexpected snowstorm dropped 6ö of snow causing traffic accidents, including one that involved 35 cars on Highway 99W, which caused a temporary closure on the impacted area of the roadway. Other local roads and highways were also closed as a result of the storm.
December 2013 <sup>1</sup>	Winter Storm	Two cold fronts and a snowstorm in December 2013 caused damaged to homes because of freezing and bursting pipes, safety concerns for motorists and pedestrians, school closures and delays, and stormwater flooding. Road closures caused by the snowstorm included emergency routes in Dundee. In Amity freezing pipes resulted in a death when a resident was unable to access water to put out a fire in his home's stovepipe.
February 5-7, 2014 <sup>1</sup>	Winter Storm	Severe storms delivered 6ö-13ö of heavy snow and ice throughout Yamhill County, resulting in dangerous driving and walking conditions as well as traffic delays. Stormwater flooding, tree limb damage and downed trees caused by accumulations of snow and ice contributed to dangerous conditions on the streets. The Wheatland Ferry was also closed. While economic impacts are not fully understood at this point it is believed that businesses were impacted as dangerous conditions lead to potential customers staying home.

Source: (ONHW 2006, FEMA & OEM 2009)

<sup>1</sup>Yamhill County Natural Hazard Mitigation Plan Steering Committee, February 26, 2014

### 4.5.10.3 Location

All areas of Yamhill County and participating jurisdictions can be affected by severe winter storms occurring between October and March that originate in the Gulf of Alaska or the central Pacific Ocean. Snow events can occur if a wet Pacific storm reaches the



area when a cold air mass is present. Also, a natural break in the Cascade Mountains sometimes allows cold air from the east to funnel through the Columbia Gorge into the Portland area, which can eventually settle south to the Willamette Valley, and thus create snow and ice events. Ice events include freezing rain, sleet, and hail.

Cold air rarely travels west of the Cascade Range, as the mountains provide a natural barrier separating the Willamette Valley from the cold air to the east. However, the Columbia River Gorge can provide a low-level passage funneling cold air westward. Rain, sleet, and/or snow will fall if moisture-saturated warm air from the Pacific moves into the area colliding with the colder air mass.

#### **4.5.10.4 Extent**

Yamhill County is located in Climate Zone 2, generally consisting of wet winters and dry summers. Winter storm characteristics are determined by the amount and extent of ice and snow, air temperature, wind speed and wind direction. Winter storms can cause power outages, transportation and economic disruptions, injuries, and loss of life. Winter storms can also cause traffic related accidents and death, hypothermia, and heart attacks from snow shoveling. Emergency response times can be slowed because of icy road conditions. The weight of the snow or ice can cause utility disruption and falling trees and limbs. Snowmelt can cause flooding and landslides (State of Oregon 2006).

#### **4.5.10.5 Probability of Future Events**

Historical data shows that the probability for annual winter storm recurrence is high with a one year recurrence interval. Winter storms combined with other weather events, like La Niña cycle, often result in compounded hazards countywide. Increased precipitation and decreased temperatures associated with La Niña periods can result in widespread flooding and severe winter storms. Winter storms have caused flooding, landslides, debris flows, utility and transportation systems disruptions.

### 5 VULNERABILITY ANALYSIS

This section provides an overview of the vulnerability analysis and describes the five specific steps: asset inventory, methodology, data limitations and exposure analysis for current assets, and areas of future development. County- and city-specific asset inventory and exposure analysis tables are listed in [Section 7](#).

#### 5.1 OVERVIEW OF VULNERABILITY ANALYSIS

A vulnerability analysis predicts the extent of exposure, and the impacts that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps including asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

The requirements for a vulnerability analysis as stipulated in DMA 2000 and its implementing regulations are described below.

- A summary of the community's vulnerability to each hazard that addresses the impact of each hazard on the community.

##### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

###### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

###### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.

##### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

###### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

###### **Element**

- B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

## Vulnerability Analysis

- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

### DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment

#### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)?

Source: FEMA, March 2013.

## 5.2 VULNERABILITY ANALYSIS: SPECIFIC STEPS

### 5.2.1 Asset Inventory

An asset inventory is the first step of a vulnerability analysis. Assets throughout the County that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates Yamhill County's existing building and infrastructure assets and insured values and are identified in detail in Section 7.1. Jurisdiction-specific asset inventories are located in Section 7.

Section 7.1, Tables 7.1-8 through 7.1-10 (and respective jurisdiction-specific addenda Sections 7.2-7.9) portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type.

Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

Members of the countywide Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to update the vulnerability assessment and to inform the prioritization of mitigation action items. During this exercise Steering Committee members were asked to identify the most important and most vulnerable assets in their jurisdictions within the following categories: human population, economy, cultural and historic resources, infrastructure and critical facilities, and environment. The worksheets used can be found in Appendix D.

## Vulnerability Analysis

Yamhill County seeks to protect its population by supporting Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk is mitigated.

### 5.2.1.1 Population and Building Stock

Population data for all of Yamhill County were obtained from the 2000 and 2010 U.S. Census, which was collected at the census block level as well as the Portland State University Population Center. Yamhill County's total population for 2000 was 84,992 and was estimated to be 90,310 for 2005, and the Portland State University estimated an increase to 101,400 for 2013. (Section 7.1, Table 7.1-6A) Jurisdiction-specific data are found in their respective addenda (7.1-7.9).

Estimated numbers of residential buildings and replacement values for those structures, as shown in the Yamhill County Addendum, were obtained from the Yamhill County Tax Assessor's Office. A total of 23,543 residential buildings valued at approximately \$2.28 Billion were considered in this analysis, including single-family dwellings, mobile homes, multifamily dwellings, temporary lodgings, and institutional dormitory facilities.

### 5.2.1.2 Repetitive Loss Properties

Repetitive loss properties are properties that suffer from repeated flooding. FEMA defines a RL property as a property with at least two \$1,000 claims within any 10-year period since 1978. SRL properties have been identified by FEMA as most at risk for repeat flooding. These properties include every property that since 1978 has experienced: four or more separate building and content claims (that are NFIP insured) each exceeding \$5,000 with cumulative claims exceeding \$20,000, or at least two separate building claims with cumulative losses exceeding the value of the property (that is, the value of the structure).

Table 6-1 shows general RL property data located within the county. Locations and addresses for both RL and SRL properties are not available for publication, however are kept on file with the Yamhill County Floodplain Coordinator.

**Table 5-1. Countywide Repetitive Loss Properties (NFIP Insurance Report)**

Type	Community	Total Claims Since 1978	Flood Insurance	Value (\$) <sup>1</sup>	Total Claims (\$) <sup>2</sup>
RL	City of McMinnville	2	Yes	4,973,200	223
RL	City of Newberg	1	Yes	1,160,000	0
RL	City of Sheridan	52	Yes	75,368,400	761,088
RL	City of Willamina	5	Yes	3,610,700	18,320
RL	Yamhill County	23	Yes	29,335,600	222,035

### 5.2.1.3 Critical Facilities and Infrastructure

A critical facility is defined as a local (non-State or Federal) facility in either the public or private sector that provides essential products and services to the general public, such as preserving the quality of life in Yamhill County and fulfilling important public safety, emergency response, and disaster recovery functions. The critical facilities profiled in this plan include the following:

- Local government facilities, such as departments, agencies, and administrative offices
- Emergency response facilities, including police, fire, and Emergency Operations Centers
- Hospitals
- Educational facilities, including A-12
- Care facilities, such as congregate living health, residential care, and continuing care retirement facilities
- Community gathering places, such as parks, museums, libraries, and senior centers

The total number of county-identified critical facilities within the county is listed in Section 7.1 and shown on Figure A-16. The incorporated city-specific critical facilities are listed in Sections 7.2-7.9 and Figures A-17 through A-25.

Similar to critical facilities, critical infrastructure includes infrastructure that is essential to preserving the quality of life and safety in the county. Critical infrastructure profiled in this plan includes the following:

- State and Federal Highways
- Railroad Tracks
- Local, State, and Federal bridges
- Utilities, including communication (cell, radio, and television), water and wastewater, and electrical facilities.

### 5.2.2 Methodology

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of probability or level of damage.

Using census block level information, a spatial proportion was used to determine the percentage of the population and residential and nonresidential structures located where hazards are likely to occur. Census blocks that are completely within the boundary of a hazard area were determined to be vulnerable and were totaled. A spatial proportion was also used to determine the amount of linear assets, such as highways, within a hazard area. The exposure analysis for linear assets was measured in miles.

## **Vulnerability Analysis**

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Replacement values or insurance coverage were developed for physical assets. These values were provided by the county and each jurisdiction. For facilities that did not have specific values per building in a multi-building scenario (e.g., schools), the buildings were grouped together and assigned one value where available. Value information is not available for all critical facilities at this time and will be collected as it becomes available. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated.

A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

### **5.2.3 Data Limitations**

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this NHMP to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the NHMP.

### **5.2.4 Exposure Analysis**

The results of the exposure analysis for loss estimations in Yamhill County and each participating jurisdiction are located in Sections 7.1-7.9. Each addendum represents a jurisdiction and lists the critical facilities and the specific hazard areas in which each facility is located.

### **5.2.5 Areas of Future Development**

Yamhill County and the participating jurisdictions represented in this NHMP seek to protect its population by supporting Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any proposed essential infrastructure component will undergo stringent review and design to ensure potential hazard risk is mitigated.

**DRAFT**

### 6 MITIGATION STRATEGY

This section outlines the four-step process for updating the mitigation strategy including: reviewing mitigation goals, reviewing existing mitigation actions, evaluating and prioritizing mitigation actions, and updating the mitigation action plan. The Steering Committees reviewed the mitigation goals and actions for the entire county and its nine incorporated cities. Where appropriate, the committee modified, created new or deleted goals and actions. County- and city-specific Mitigation Action Plans are listed in [Section 7](#).

#### DMA 2000 Requirements: Mitigation Strategy-Overview

##### Mitigation Strategy

Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

##### Element

- C1. Does the plan document each jurisdictions existing authorities, policies, programs, and resources and its ability to expand on and improve these existing policies and programs?

Source: FEMA, March 2013.

### 6.1 MITIGATION GOALS

The requirements for local hazard mitigation goals are described below.

#### DMA 2000 Requirements: Mitigation Strategy-Local Hazard Mitigation Goals

##### Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

##### Element

- C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?

Source: FEMA, March 2013.



## Mitigation Strategy

**Table 6-1. 2014 Yamhill County Mitigation Goals**

Goal Number	Goal Description
1	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	<b>PREVENTIVE</b> <i>Goal Statements:</i> - Develop and implement activities to protect human life, commerce, and property from natural hazards. - Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
7	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

During the April 9 and May 21, 2014 steering committee meetings, the County and participating jurisdictions reviewed County and city-specific vulnerability analysis results as a basis for developing the mitigation goals and potential mitigation actions. (Section 7)

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. As such, the Steering Committee updated the 2006 & 2009 goals to align with the changing needs of their communities and with the State of Oregon's mitigation planning goals.

### 6.2 IDENTIFYING MITIGATION ACTIONS

The requirements for the identification and analysis of mitigation actions are described below.

#### DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions

##### Identification and Analysis of Mitigation Actions

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### Element

- **C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?**

Source: FEMA, March 2013.

The Steering Committee met on May 21, 2014 to assess and revise a list of potential mitigation actions after finalizing the mitigation goals. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Section 7.1, Table 7.1-12 depicts the County's existing and newly considered mitigation actions developed during this mitigation plan update to support this NHMP update. The addendum further defines whether the existing actions were completed, deleted, deferred, or ongoing. Table 6-2 (below) lists priority action item summaries for each participating jurisdiction in Yamhill County. Section 7 contains County and jurisdiction-specific mitigation actions to reduce hazard impacts to new and existing buildings and infrastructure.

## Mitigation Strategy

**Table 6-2. Priority Action Items by Jurisdiction**

<b>Jurisdiction</b>	<b>Proposed Action Item</b>
<b>Yamhill County</b>	Update regional debris management plan
<b>Yamhill County</b>	Develop labor & equipment tracking protocols for NH damage/disaster assessment information gathering.
<b>Yamhill County</b>	Steering committee to prioritize MHMP Action Items
<b>Yamhill County</b>	Determine critical bridge infrastructure & life line routes & water, sewer, power
<b>Yamhill County</b>	Review & assessment of sewage infrastructure
<b>Yamhill County</b>	Build a cadre of community volunteers to form an Emergency Preparedness Speakers Bureau
<b>City of Amity</b>	Retrofit important public facilities with significant seismic vulnerabilities
<b>City of Amity</b>	Retrofit bridges that are not seismically adequate
<b>City of Dayton</b>	Evaluate and harden public infrastructure crossing bridges or rivers
<b>City of Dayton</b>	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.
<b>City of Dayton</b>	Identify and prioritize all "jurisdiction-owned" and "non-jurisdiction owned" critical facilities that have backup power and emergency operations plans.
<b>City of Lafayette</b>	Purchase electronic reader board for the hwy. through Lafayette next to City Hall
<b>City of Lafayette</b>	Develop Reverse 911 system
<b>City of Lafayette</b>	Purchase and all terrain vehicle transportation
<b>City of Newberg</b>	Integrate the Mitigation Plan findings into planning & regulatory documents & programs and into enhanced emergency planning.
<b>City of Newberg</b>	Develop early warning test program: partnering w/ NOAA, city police, fire department to coordinate test
<b>City of Newberg</b>	Review critical facilities & gov't buildings structures
<b>City of Sheridan</b>	Establish a hazard mitigation planning committee
<b>City of Sheridan</b>	MH-Cross reference and incorporate mitigation planning provisions into all community planning processes, planning, transportation plans
<b>City of Sheridan</b>	Identify and pursue funding opportunities to implement mitigation processes
<b>City of Willamina</b>	Purchase and install generators for critical facilities
<b>City of Yamhill</b>	Develop water conservation plan for drought emergency
<b>City of Yamhill</b>	Coordinate installation of main power transfer switches
<b>City of Yamhill</b>	Develop snow removal plan
<b>City of Yamhill</b>	Clean flood prone waterways

## Mitigation Strategy

### DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance

#### National Flood Insurance Program (NFIP) Compliance

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

#### Element

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

Yamhill County, and the Cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina, and Yamhill City all actively participate in the NFIP and have implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance. The City of Sheridan has exceeded NFIP minimum requirements to receive a Community Rating System (CRS) rating of 8.

Each jurisdiction's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives. They subsequently selected and prioritized County or community appropriate actions to ensure an effective flood mitigation program. The County and jurisdictional addenda (Section 7) describe their respective processes. Each jurisdiction also specifically addressed mitigation actions associated with RL properties.

### 6.3 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

The requirements for the evaluation and implementation of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

### DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions

#### Implementation of Mitigation Actions

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### Element

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

The Steering Committee then met on May 21, 2014 to evaluate and prioritize each of the mitigation actions to determine which considered actions would be included in the jurisdiction-specific Mitigation Action Plans updated as outlined in Section 7. Meeting participants chose the top 3-5 new actions and/or existing actions from their 2009 action item pools that would be of the highest priority and would be explored in more detail in

## Mitigation Strategy

the jurisdiction-specific appendices. Participants used a worksheet format to determine the responsible agency, potential funding sources, specific implementation ideas, and other detailed information. The jurisdiction-specific Mitigation Action Plans represent mitigation projects and programs to be implemented through the cooperation of multiple entities. The prioritized action item worksheets can be found in each jurisdiction's addendum and blank worksheets can be found in Appendix D.

Upon review, the Steering Committees assigned a high priority ranking to actions that best fulfill the goals of the NHMP and are appropriate and feasible for each jurisdiction and responsible entities to implement during the 5-year lifespan of this version of the NHMP. As such, the Steering Committee determined that only the existing and new mitigation actions that received a high priority ranking would be explored in further detail using the worksheet described above. Section 7 depicts the mitigation actions grouped by hazard and in descending priority order within each hazard.

### 6.4 IMPLEMENTING A MITIGATION ACTION PLAN

The requirements for the identification of a mitigation action for each participating jurisdiction, as stipulated in DMA 2000 and its implementing regulations, are described below.

#### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

##### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

##### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

Yamhill County, NHMP Section 7.1, Table 7.1-12 identifies existing mitigation actions' status (i.e. completed, deleted or deferred mitigation actions) and provided comments regarding those actions that were deferred or deleted. The table indicates ongoing for those actions that were implemented and are now continuous initiatives.

The Mitigation Action Worksheets state that the benefit-costs consideration will be determined once an action undergoes development, and how each mitigation action will be implemented and administered by the responsible entity where appropriate.

The jurisdiction-specific Mitigation Action Plans and prioritization methods used are provided in each jurisdiction's addendum.

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## Jurisdictional Addenda Yamhill County

### 7 JURISDICTIONAL ADENDA

This section includes the community descriptions, planning processes, capability assessments, hazard identification and screening, vulnerability analyses, and mitigation strategies for Yamhill County and the participating jurisdictions of the cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina, and Yamhill.

#### 7.1 YAMHILL COUNTY

This addendum contains specific Yamhill County information to support the 2014 Multi-Jurisdictional Hazard Mitigation Plan update.

This section further supports the County's planning process by summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

#### COMMUNITY DESCRIPTION

The population of Yamhill County increased by over 19 percent between 2000 and 2013 from 84,992 to 101,400 residents, accounting for 2.6 percent of Oregon's total population. (PSU 2014) The largest cities by population are McMinnville (32,510), Newberg (22,580), and Sheridan (6,180). The median household income in 2000 was \$44,111 and rose to \$53,950 in 2012, representing an increase of 18.2 percent. In 2012, there were 37,056 housing units with 16.7 percent being multi-unit structures. In 2000, there were 30,270 housing units. Median housing values increased from \$146,200 in 2000 to \$235,300 in 2012. Renters occupied 10,282 units in 2012 and median rent was \$854. (U.S. Census 2006, 2012)

In 2000, 41,891 individuals 16 years and over were in the labor force. The unemployment rate was 6.4 percent. Comparatively, 64.1 percent or 49,530 individuals 16 years and over were in the labor force in 2013. Just over 90 percent (44,782) were employed leaving just under 10 percent (4,748) unemployed. Between 2000 and 2013, the number of families and individuals living below the poverty level increased. In 2000, 6.0 percent of families and 9.2 percent of individuals lived below the poverty level. In 2013, 13.9 percent of families, and 19.9 percent of individuals lived below the poverty level. (U.S. Census 2006, 2012)

##### DMA 2000 Requirements: Planning Process

###### Planning Process

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

###### Element

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

###### Documentation of the Planning Process

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

###### Element

## Jurisdictional Addenda Yamhill County

### DMA 2000 Requirements: Planning Process

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

Yamhill County is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill that goal, the County organized a Hazard Mitigation Plan development Steering Committee dedicated to identifying hazard threats and developing actions that can be taken to mitigate damage and life losses from those threats.

Table 7.1-1 contains the County's Steering Committee participant list for the Yamhill County MHMP planning elements.

Table 7.1-1. Yamhill County Steering Committee	
Name	Agency/Department/Affiliation
Sue Lamb	County Emergency Manager (Current)
Ken Nygren	Assistant Emergency Manager
Bill Gille	County Engineer
Ken Friday	County Planning Division Manager
Gary Van Der Veen	County Environmental Health Specialist
Sarah Bates	County Public Health Preparedness Coordinator
Chris Shultz	Community Preparedness Specialist

Table 7.1-2 contains a summary of the County's public involvement and planning meeting activities.

Table 7.1-2. Yamhill County Public Involvement Mechanisms	
Mechanism	Description
Public Survey	Link to survey and explanation posted on county Facebook and Twitter accounts
Presentation at Emergency Preparedness Committee meeting	Presented a summary of the MHMP at the monthly EPC and attendees had opportunity to answer survey questions via Dot Chart voting
Press release	Once DRAFT approved by Commissioners, the plan will be announced in a press release and posted to county website for public input.
Poster notifying public of MHMP	Poster describing the MHMP is presented at public emergency preparedness fairs, sent to established distribution list, and public engagement events.



## CAPABILITY ASSESSMENT

Table 7.1-3, A-4, and A-5 contain the County's resources used to support planning activities, including the reports and studies reviewed as part of the update process.

<b>Table 7.1-3. Yamhill County Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Emergency Operations Plan	Identifies emergency planning, policies, procedures, and response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies.
	Comprehensive Plan	Defines County governance, responsibilities, land use, zoning and delineates agency areas of responsibilities
	Transportation Plan	Describes long range use and future development of the transportation system.
	Zoning Plan	Describes current and future zoning initiatives
	Public Health Comprehensive Plan	A multi-year plan that describes how Yamhill County Public Health is addressing essential and other functions of health in the community.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Land Use Ordinances	Defines land use regulations, requirements and use, and identifies floodplain areas
	Zoning Ordinances	Defines building use zones and identifies floodplain areas

## Jurisdictional Addenda Yamhill County

**Table 7.1-4. Yamhill County Administrative and Technical Resources for Hazard Mitigation**

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Engineer Planner
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Engineer
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planner
Floodplain manager	State Flood Plain Manager: Christine Shirley
Personnel skilled in GIS and/or HAZUS-MH	Contracted through MidWillamette Valley COG
Director of Emergency Services	Emergency Manager County Fire Defense Board
Finance (grant writers, purchasing)	Finance Manager; Grant Writer
Public Information Officers	Emergency Manager Public Health Sheriff's Office

**Table 7.1-5. Yamhill County Financial Resources for Hazard Mitigation**

Financial Resources	Effect on Hazard Mitigation
General funds	Case-by-case
Authority to levy taxes for specific purposes	yes
Incur debt through general obligation bonds	unknown
Incur debt through special tax and revenue bonds	unknown
Incur debt through private activity bonds	unknown
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment: Identifying Hazards**

#### **Identifying Hazards**

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### **Element**

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The Yamhill County Steering Committee determined that the following natural hazards could potentially threaten the County.

<i><b>Natural Hazards</b></i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
Drought	X

## OVERVIEW OF VULNERABILITY ANALYSIS

This section summarizes County specific vulnerability information. It comprises:

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

## Jurisdictional Addenda Yamhill County

### DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

#### Assessing Vulnerability: Overview

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### Element

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties

#### Assessing Vulnerability: Addressing Repetitive Loss Properties

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### Element

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

### DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment

#### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## VULNERABILITY ANALYSIS:

### Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the County's existing building and infrastructure assets and insured values and are identified in detail in Tables A-6A, A-6B, and A-7. Tables A-8, A-9, and A-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily

## **Jurisdictional Addenda Yamhill County**

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available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

Yamhill County seeks to protect its population by supporting State of Oregon initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### **Population and Building Stock**

Population data listed in Table 7.1-6A were obtained from the 2000 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The County's existing building, infrastructure, and insured values are identified in Tables A-5, A-6, and A-7.

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<b>Table 7.1-6A. Yamhill County Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>3</sup></b>	<b>Total Building Count</b>	<b>Total Value of Buildings (\$)<sup>1</sup></b>
85,500	90,310	101,400	23,543	2,281,699,401

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$146,500 per structure).

<sup>2</sup> Yamhill County 2013 SAL Report (Summary of Assessments and Levies) :

<sup>3</sup> Portland State University (PSU) 2014 Oregon Population Report.

<b>Table 7.1-6B. Yamhill County NFIP Insurance Report</b>								
<b>City of</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>2</sup></b>
Yamhill County	91,917	86	147	29,335,600	625.29	23	222,035	1

**Source:** FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>2</sup>Content and building claims.

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Yamhill County**

**Table 7.1-7. Yamhill County Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	Yamhill County Public Works	2060 Lafayette Ave.	Unknown
	Yamhill County Fairgrounds	2070 Lafayette Ave., McMinnville	Unknown
	Yamhill County Dog Control	2070 Lafayette Avenue, McMinnville	Unknown
	Evergreen-Doe Humane Society	NE 15 <sup>th</sup> Street, McMinnville	Unknown
	Yamhill County Courthouse	535 NE Fifth Street	Unknown
	Yamhill County Jail	535 NE Fifth Street	Unknown
	Yamhill County SO	535 NE Fifth Street, McMinnville	Unknown
Educational	Yamhill County EM	414 NE Evans Street, McMinnville	Unknown
	Wascher Elementary School	986 East Seventh Street	Unknown
	Buel Elementary	1985 SE Davis Street	Unknown
	Columbus Elementary	1600 SW Fellows Street	Unknown
	Cook Elementary	800 NE Lafayette Avenue	Unknown
	Grandhaven Elementary	3200 NE McDonald Lane	Unknown
	Memorial Elementary	501 West 14 <sup>th</sup> Street	Unknown
	Newby Elementary	1125 West Second Street	Unknown
	Antonia Crater Elementary School	203 West Foothills	Unknown
	Edwards Elementary School	715 East Eighth Street	Unknown
	Ewing Young Elementary School	17600 NE North Valley Road	Unknown
	Joan Austin Elementary	2200 North Center Street	Unknown
	Mable Rush Elementary	1441 Deborah Road	Unknown
	Perrydale School	7445 Perrydale Road	Unknown
	Faulconer Chapman School	332 SW Cornwall Street	Unknown
	Duniway Middle School	575 Michelbook Lane	Unknown
	Patton Middle School	1175 East 19th	Unknown
	Chehalem Valley Middle School	403 West Foothills	Unknown
	Mountain View Middle School	2015 North Emery Drive	Unknown
	Yamhill-Carlton Union High School	275 North Maple Street	\$42,933
	Bethel Christian School	325 NW Baker Creek Road	Unknown
	McMinnville Adventist Christian School	1349 NW Elm Street	Unknown
	McMinnville Montessori School	1101 SE Brooks Street	Unknown
	Saint James Catholic School	206 NE Kirby Street	Unknown
	St. John Lutheran School	2142 NE McDonald Lane	Unknown
	CS Lewis Academy	200 South College Street	Unknown

**Jurisdictional Addenda  
Yamhill County**

**Table 7.1-7. Yamhill County Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Open Bible Christian School	1605 North College Street	Unknown
	Veritas Classical Christian School	401 Mission Drive	Unknown
	West Valley Academy	9015 DeJong Road, Amity	Unknown
	The Delphian School	20950 SW Rock Creek Road	Unknown
	Pioneer Christian School	885 SW Hill Drive	Unknown
	Chemeketa Community College	500 NW Hill Road, McMinnville	Unknown
	George Fox University	414 North Meridian Street, Newberg	Unknown
	Linfield College	900 NE Baker Street, McMinnville	Unknown
Care Facility	Willamette Valley Medical Center	2700 SE Stratus Avenue McMinnville	Unknown
	Providence Newberg Medical Center	1003 Providence Drive Newberg	Unknown
	McMinnville Immediate Health Care	321 N. Hwy 99W Suite B	Unknown
	Newberg Urgent Care	2880 Hayes Street	Unknown
	Virginia Garcia Memorial Health Center	115 N.E. May Lane, McMinnville	Unknown
	Physicians Medical Center	2435 NE Cumulus Ave, McMinnville	Unknown
Community	Northwest Senior & Disability Services	300 SW Hill Road McMinnville	Unknown
		2250 NE McDaniel Lane McMinnville	Unknown
		101 West Foothills, Newberg	Unknown
		917 South Bridge Street, Sheridan	Unknown
	Hillside Retirement Community	440 NW Hillside Parkway	Unknown
	Osprey Court Memory Care	320 SW Hill Road	Unknown
	Osprey Point Assisted Living	345 SW Hill Road	Unknown
	Parkland Village	3121 NE Cumulus Avenue	Unknown
	Villas of McMinnville	775 NE 27 <sup>th</sup> Street	Unknown
	Windfield Village	345 SW Hill Road	Unknown
	Astor House at Springbrook	3801 Hayes Street	Unknown
	Chehalem Springs Assisted Living	3802 Hayes Street	Unknown
	Friendsview Retirement Community	1301 East Fulton	Unknown
	Golden Villa Retirement Center	700 East Fifth Street	Unknown
	Huffman House	1307 North College	Unknown
	Deer Meadow Assisted Living	1350 West Main Street	Unknown
	Evergreen Aviation Museum	500 NE Captain Michael King Smith Way, McMinnville	Unknown



**Jurisdictional Addenda  
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**Table 7.1-7. Yamhill County Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	YCAP	Dustin Court, McMinnville	Unknown
	CVSCC (Chehalem Valley Senior Citizen Council)	125 South Elliott, Newberg	Unknown
State and Federal Highways	Hwy 99W		
	Hwy 18		
	Hwy 47		
	Hwy 240		
Railroads	Willamette & Pacific Railroad	<i>741 NE Third Street, McMinnville</i>	
Bridges	3-Mile Lane Bridge	<i>McMinnville Connects to Hwy 18</i>	Unknown
	õGreenö Bridge, Sheridan	Connects to Hwy 18	Unknown
Transportation Facilities	Cirrus Aviation	4000 SE Cirrus Avenue, McMinnville	Unknown
	Sportsman Airpark	<i>504 S. Airpark Way, Newberg</i>	Unknown
	Wheatland Ferry	Crossing Willamette River	Unknown
	Riverbend Landfill Co.	<i>13469 SE Hwy 18, McMinnville</i>	Unknown
	Boneville Power Administration	14297 Pike Road NW, Yamhill	Unknown
	McMinnville Water & Light	855 NE Marsh Lane	Unknown
	Portland General Electric	130 SW Monroe, Sheridan	Unknown
Dams	Haskins Reservoir/Dam		Unknown
	McGuire Reservoir/Dam		Unknown
	Stormy Mountain Reservoir		Unknown

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

## Vulnerability Analysis

The vulnerability analysis development process is thoroughly discussed in the main body of the Yamhill County MHMP, Section 6, which generated the following Hazard Exposure Analysis Overview. Tables A-8, A-9, and A-10 depict in tabular form results obtained from the GIS analysis depicted in hazard figures located in Appendix A.

Table 7.1-8. Yamhill County Potential Hazard Exposure Analysis Overview-Population and Buildings							
			Population	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) <sup>1</sup>	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	15,676	10,811	1,583,811,500	78	unknown
	High	100-year floodplain	30,104	10,232	1,498,988,000	77	unknown
Winter Storm		descriptive	101,400	23,543	2,281,699,401	unknown	unknown
Landslide	Moderate	14-32 degrees	51,537	16,870	2,471,455,000	112	unknown
	High	>32 degrees	26,643	9,776	1,432,184,000	45	unknown
Wildland Fire	Moderate	Moderate fuel rank	86,617	27,582	4,040,763,000	243	unknown
	High	High fuel rank	69,321	22,617	3,313,390,500	190	unknown
	Very High	Very high fuel rank	28,746	10,678	1,564,327,000	59	unknown
	Extreme	Extreme fuel rank	10,851	4,323	63,3319,500	18	unknown
Earthquake	Strong	9-20% (g)	86,627	27,566	4,038,419,000	243	unknown
	Very strong	>20-40% (g)	526	212	31,058,000	0	unknown
	Severe	>40-60% (g)	0	0	--	0	unknown
Volcano		descriptive	101,400	23,543	2,281,699,401	unknown	unknown
Wind		descriptive	101,400	23,543	2,281,699,401	unknown	unknown
Erosion		300øbuffer	--	--	--	unknown	unknown
Drought		descriptive	--	--	--	unknown	unknown

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$146,500 per structure).

Note-population by parcel was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed. ¼-mile buffered EHS sites were unable to be determined due to the use of census block data.

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**Jurisdictional Addenda  
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**Table 7.1-9. Yamhill County Potential Hazard Exposure Analysis Overview-Critical Facilities**

Hazard Type	Hazard Area	Methodology	Government		Emergency Response		Educational		Care		Community	
			No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	2	unknown
	High	100-year floodplain	--	--	--	--	1	unknown	--	--	3	unknown
Winter Storm		descriptive	9	unknown	--	--	33	43K	4	unknown	16	unknown
Landslide	Moderate	14-32 degrees	--	--	--	--	3	unknown	--	--	4	unknown
	High	>32 degrees	--	--	--	--	--	--	--	--	1	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	4	unknown	--	--	14	unknown	2	unknown	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	9	unknown	--	--	33	43K	4	unknown	16	unknown
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	9	unknown	--	--	33	43K	4	unknown	16	unknown
Wind		descriptive	9	unknown	--	--	33	43K	4	unknown	16	unknown
Erosion		300ø buffer	--	--	--	--	--	--	--	--	--	--
Drought		descriptive	9	unknown	--	--	33	43K	4	unknown	16	unknown

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**Table 7.1-10. Yamhill County Potential Hazard Exposure Analysis Overview-Critical Infrastructure**

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	1	unknown	1	unknown	--	--	--	--
	High	100-year floodplain	--	--	--	--	1	unknown	4	unknown	--	--	2	unknown
Winter Storm		descriptive	4	unknown	1	unknown	2	unknown	7	unknown	--	--	3	unknown
Landslide	Moderate	>14-32 degrees	--	--	--	--	1	unknown	3	unknown	--	--	2	unknown
	High	>32 degrees	--	--	--	--	--	--	1	unknown	--	--	2	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	--	--	--	--	1	unknown	3	unknown	--	--	2	unknown
	Very High	Very high fuel rank	--	--	--	--	--	--	2	unknown	--	--	2	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	1	unknown
Earthquake	Strong	9-20% (g)	4	unknown	1	unknown	2	unknown	7	unknown	--	--	3	unknown
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	4	unknown	1	unknown	2	unknown	7	unknown	--	--	3	unknown
Wind		descriptive	4	unknown	1	unknown	2	unknown	7	unknown	--	--	3	unknown
Erosion		300øbuffer	--	--	--	--	--	--	--	--	--	--	--	--
Drought		descriptive	4	unknown	1	unknown	2	unknown	7	unknown	--	--	3	unknown

Total miles for highways and railroads were not provided. Numbers represent number of segments.

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**MITIGATION ACTION ITEMS CONSIDERED**

<b>Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered</b> <b>(Blue text items are the County's pre-identified Mitigation Action Items-2009 HMP)</b> <b>Items marked with an asterisks (*) are a priority for the County.</b>			
<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
Multi-Hazard *	On-going		Develop, produce, and distribute information materials concerning mitigation, preparedness and safety procedures for all natural hazards.
Multi-Hazard (14a) *	Ongoing		Review and update the Natural Hazards Mitigation Plan on an annual basis. Conduct a complete review of the plans and have then officially promulgated by the BOC every five years.
Multi-Hazard (14b) *	Ongoing		Review and update the Yamhill County Emergency Operations Plan on an annual basis. Conduct a complete review of the plans and have then officially promulgated by the BOC every five years.
Multi-Hazard (1)	Ongoing		Provide assistance to incorporated communities and special districts in development of Natural Hazards Mitigation Plans.
Multi-Hazard (2)	Ongoing		Consider the goals and action items from the Yamhill County Natural Hazard Mitigation Plan for implementation in other county documents and programs, where appropriate.
Multi-Hazard (3)	On-going		Evaluate the effectiveness of existing programs and identify shortcomings in natural hazard mitigation. Balance the objectives of program goals with natural hazard mitigation.
Multi-Hazard (4)	On-going		Utilize new part-time County grant writer to identify funding opportunities for developing and implementing local and county mitigation activities. Identify potential County funding sources such as: general fund, transportation fund, etc. for all ongoing mitigation actions.
Multi-Hazard (5)	Deferred	Lack funding and staff availability	Develop a process for the Yamhill County Natural Hazards Mitigation Plan Steering Committee to assist in implementing, monitoring, and evaluating countywide mitigation activities.
Multi-Hazard (6)	Ongoing	Should be a priority	Determine the impact that each natural hazard could have on priority transportation routes to and from emergency facilities and first responder sites. DOGAMI corridor study is in progress



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**Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered**  
**(Blue text items are the County's pre-identified Mitigation Action Items-2009 HMP)**  
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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
Multi-Hazard (7)	Ongoing		Identify collaborative and related programs that recognize ways to decrease the risks of natural hazards including FEMA FLIP and FIRM.
Multi-Hazard (8)	On-going		Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration in Yamhill County such as MOUs and CPODS etc.
Multi-Hazard (9)	Complete	Through Planning department	Develop GIS inventories of essential facilities, at-risk buildings and infrastructure, and prioritize mitigation projects.
Multi-Hazard (10)	On-going	Consolidated #10,11,12 into one action item	Strengthen emergency services preparedness and response by linking emergency services with natural hazard mitigation programs, and enhance public education on a regional scale. <del>Develop, enhance, and implement education programs aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property owners, businesses, and schools. Sustain a public awareness campaign about natural hazards.</del>
Multi-Hazard (11)	Delete	Consolidated #10,11,12 into one action item	Develop, enhance, and implement education programs aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property owners, businesses, and schools
Multi-Hazard (12)	Delete	Consolidated #10,11,12 into one action item	Sustain a public awareness campaign about natural hazards.
Multi-Hazard (13)	Ongoing	All cities in Yamhill Co have EOPs	Sustain an education and outreach program for local jurisdictions and assist them in developing emergency operations, public information and hazard mitigation plans.
Multi-Hazard (15)	Completed	On the county website	Make the Yamhill County Emergency Operations Plan and the Natural Hazards Mitigation Plan, and other resources on hazard planning /mitigation available to the public electronically.
Multi-Hazard (16)	Ongoing	Per code	Promote hazard resistant utility construction and maintenance methods.
Multi-Hazard (17)	Deferred	Reword to a collective impact picture	Develop a system for data collection for undeclared natural hazard events.
Multi-Hazard (18)	Deferred	Lack funding and staff availability	Improve coordination of and evaluate technical and engineering gaps in response service for natural hazard events. Develop a long-term recovery plan for Yamhill County from the effects of natural hazards.
Multi-Hazard (19)	Delete	Combined with Multi-Hazard #4	Identify potential County funding sources such as: general fund, transportation fund, etc. for all ongoing mitigation actions.

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**Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered**  
**(Blue text items are the County's pre-identified Mitigation Action Items-2009 HMP)**  
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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
Multi-Hazard (20)	New	Put this at top of list; high priority	Provide public alert and warning system.
Multi-Hazard (21)	New		Update jurisdictional debris management plan
Multi-Hazard (22)	New		Develop labor & equipment tracking protocols for NH damage/disaster assessment information gathering.
Multi-Hazard (23)	New		Steering committee to prioritize Natural Hazard Mitigation Plan
Multi-Hazard (24)	New		Determine critical bridge infrastructure & life line routes & water, sewer, power
Multi-Hazard (25)	New		Review, Assessment of Sewage Infrastructure
Multi-Hazard (26)	New		Build a cadre of community volunteers to form an Emergency Preparedness Speakers Bureau
<b>Flood</b>			
Flood (ST1)	Deferred	Lack funding; could be tied into iPAWS and social media	Develop better flood warning systems to communicate with the public.
Flood (ST2)	Completed		Maintain an inventory of all permitted dams built for flood control purposes in the county.
Flood (ST3)	Completed	Yamhill County has exceeded requirements and has become CRS certified	Implement the steps needed for Yamhill County to become a participant in the NFIP's Community Rating System
Flood (LT1)	Completed 2005; Updated 2010	Planning Dept.	Update and improve the FIRM maps for Yamhill County as funding becomes available.
Flood (LT2)	Deferred	Lack funding and staff availability	Enhance data and mapping for floodplain information in the county, and identify and map flood prone areas outside of designated floodplains.
Flood (LT3)	Deferred	Lack funding and staff availability	Seek funding to train elected officials and recorders in small towns who have no emergency management background.
Flood (LT4)	On-going	Website; social media; community outreach	Provide flood event education and outreach to households and businesses.

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**Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered**  
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Hazard / Priority	Status (Complete, Deferred, Deleted, Ongoing)	Comment	Description
		presentations	
Flood (LT5)	On-going	availability	Seek funding to retrofit culverts in Yamhill County with pipes designed for 50 to 100-year flood intervals.
Flood (LT6)	Deferred; attempted to study, but not successful	Federal Marine Fisheries NMFS will not allow gravel removal	Coordinate with Yamhill SWCD, DOGAMI and NOAA to identify funding sources for further study of the gravel accumulations in the Willamette River at Lambert Bend.
Flood (LT7)	Deleted	Applies only to City of Sheridan at this time	Mitigate repetitive flood loss properties.
<b>Winter Storms</b>			
Winter Storms *	On-going	Region 1 has a plan dated 2008; needs updating & training	Update, develop, implement, and maintain jurisdictional debris management plans.
Winter Storms (LT2)*	On-going	Mobile apps	Improve weather monitoring to attain earlier severe winter storm warnings and send notifications to responders and public.
Winter Storms (ST1)	On-going		Develop and implement or enhance strategies for debris management due to severe winter storms. Need to include labor & equipment tracking protocols for efficient disaster assessment information gathering.
Winter Storms (ST2)	On-going		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storms (ST3)	On-going	Fire AOR	Seek funding to acquire necessary emergency back-up power systems for all RFPD facilities and other identified critical facilities.
Winter Storms (LT1)	On-going	Pub Health/EM/ joint preparedness coordinator outreach	Increase public awareness of severe winter storms and the benefits of mitigation activities through education aimed at households and businesses and increase targeting of vulnerable populations.
Winter Storms (LT3)	On-going		Develop and implement programs to keep trees from threatening lives, property, and public infrastructure as a result of severe weather events.
Winter Storms (LT4)	Deferred	Lack funding and staff availability	Develop and maintain comprehensive impact database and, when possible, map and publicize historical severe weather events in Yamhill County.

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**Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered**  
**(Blue text items are the County's pre-identified Mitigation Action Items-2009 HMP)**  
**Items marked with an asterisks (\*) are a priority for the County.**

<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
Winter Storms (LT5)	Deferred	Lack funding and staff availability	Support/encourage electrical utilities through public incentives/ partnerships to use underground construction methods where possible to reduce power outages from severe winter storms.
Winter Storms (LT6)	Ongoing		Promote the benefits of tree-trimming and tree replacement programs and help coordinate local efforts by public and private agencies.
Winter Storms (LT7)	Delete	Duplicated in LT6	
Winter Storms (LT8)	Deferred	Lack funding and staff availability	Encourage right-of-way coordination, education and management between property owners, utility operators, and government agencies.
Winter Storms (LT9)	Delete	This is Standard Operating Procedure and is duplicated in LT6 Public Works	Encourage harvesting of trees that are blown down during a winter storm.
<b>Landslide</b>			
Landslide (ST1)	Deferred	Lack funding and staff availability	Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.
Landslide (ST2)	Deferred	Lack funding and staff availability	Encourage construction, site location and design that can be applied to steep slopes to reduce the potential threat of landslides.
Landslide (ST3)	Deferred	Lack funding and staff availability	Identify safe evacuation routes in high-risk debris flow and landslide areas.
Landslide (ST4)	Ongoing	DOGAMI mapping	Compile relative landslide risk maps for Yamhill County.
Landslide (ST5)	Ongoing		Increase public education related to landslide hazards by distributing DOGAMI landslide informational brochure
Landslide (LT1)	Deferred	Lack funding and staff availability	Evaluate current landslide warning systems to ensure effectiveness and efficiency. Increase coordination between local jurisdictions, emergency responders, homeowners, and ODF
Landslide (LT2)	Deferred	Lack funding and staff availability	Mitigate activities in identified potential and historical landslide areas through public outreach.
Landslide (LT3)	Delete	Combined with LT1	Increase coordination between local jurisdictions, emergency responders, homeowners

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**Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered**  
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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
			and ODF for landslide warning systems.
Landslide (LT4)	Deferred	Lack funding and staff availability	Investigate the development and implementation of a county landslide ordinance.
Landslide (LT5)	Deferred	Lack funding and staff availability	Protect existing development in landslide-prone areas.
Landslide (LT6)	Delete		Maintain public and private drainage systems
<b>Wildland Fires</b>			
Wildland Fire (LT5)*	Ongoing		Maintain and further develop interagency and private industry relationships for continuing strong fire response in Yamhill County.
Wildland Fire (ST1)	Ongoing		Work with the Yamhill Fire Defense Board in the review of plans and inspection of structures, access and water supply for fire code compliance.
Wildland Fire (ST2)	Completed 2009		Develop a Community Wildfire Protection Plan for susceptible urban/wildland interface areas in Yamhill County.
Wildland Fire (ST3)	Ongoing		Advocate water storage facilities with fire resistant electrical pump systems in developments not connected to a community water/hydrant system.
Wildland Fire (ST4)	Ongoing	CWPP	Continue to promote public awareness campaigns for individual property owners living in the wildland/urban interface (WUI).
Wildland Fire (ST5)	Ongoing	CWPP	Seek funding and labor opportunities to staff fuel-reduction projects throughout wildfire hazard-prone areas in Yamhill County.
Wildland Fire (ST6)	Ongoing	CWPP	Create incentives and assist landowners in reducing fuel loads on private property.
Wildland Fire (ST7)	Ongoing	CWPP	Increase communication, coordination and collaboration between wildland/urban interface property owners, city and county planners, and fire prevention crews and officials to address inherent risks in wildland/urban interface areas, existing mitigation (prevention/protection) measures, and federal mitigation assistance programs.
Wildland Fire (ST8)	Deferred	Lack funding and staff availability	Seek improved information gathering and distribution and technology for enhancing fire identification, initial response and evacuation if necessary.
Wildland Fire (ST9)	Ongoing	CWPP	Enhance emergency services to increase the efficiency of wildfire response and recovery activities.

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**Table 7.1-12. 2014 Yamhill County Mitigation Actions - Existing and Newly Considered**  
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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
Wildland Fire (ST10)	Ongoing	Lack funding and staff availability	Educate agency personnel on federal cost-share and grant programs, fire protection agreements, and other related federal programs so the full array of assistance available to local agencies is understood.
Wildland Fire (ST11)	Ongoing	CWPP	Identify funding for and develop an inventory of alternative firefighting water sources and encourage the development of additional sources.
Wildland Fire (ST12)	Ongoing	Lack funding and staff availability	Identify funding for and develop an inventory of firefighting hardware to be better prepared when attacking wildfires. (Resource inventory is complete)
Wildland Fire (ST13)	Delete		.
Wildland Fire (LT1)	Complete		Promote the expansion of rural fire districts.
Wildland Fire (LT2)	Ongoing	Fire Districts AOR/ODF	Look for solutions to protect structures located outside of fire districts through partnerships, grant funding or expansion of fire district services such as ODF.
Wildland Fire (LT3)	Delete	Duplicate of ST6	Reduce wildfire fuels.
Wildland Fire (LT4)	Delete	Duplicate of ST 6	Promote and continue support of agricultural uses that reduce fuel loads in WUI areas.
Wildland Fire (LT6)	Ongoing		Seek funding to develop and implement or enhance existing outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural hazards.
Wildland Fire (LT7)	Ongoing	CWPP	Encourage development and dissemination of maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities, and to help guide emergency services during response.
Wildland Fire (LT8)	Ongoing		Encourage implementation of wildfire mitigation activities consistent with the goals of promoting sustainable ecological management and community stability.
<b>Earthquake</b>			
Earthquake (LT4) *	Ongoing		Encourage earthquake safety promotion and drills to community groups
Earthquake (ST1)	Ongoing		Integrate new earthquake hazard mapping data for Yamhill County and improve technical analysis of earthquake hazards.
Earthquake (ST2)	Delete	Through building codes; state/federal grants to retrofit older buildings	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.

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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
		Regulatory requirement	
Earthquake (ST3)	Ongoing	availability	Encourage purchase of earthquake hazard insurance by forming partnerships with the insurance and real estate industries.
Earthquake (ST4)	Delete	(duplicate; same as FL2)	Maintain an inventory of all permitted dams in Yamhill County
Earthquake (ST5)	Deferred	Lack funding and staff availability	Identify funding sources for and implement high priority structural and nonstructural retrofits of structures that are identified as seismically vulnerable.
Earthquake (LT1)	Ongoing		Promote and continue building code standards.
Earthquake (LT2)	Deferred	Lack funding and staff availability	Encourage seismic strength evaluations of critical facilities to identify vulnerabilities and to meet current seismic standards.
Earthquake (LT3)	Delete	Not the County's area of responsibility (AOR)	Identify and enhance water, sewer, electric, gas and other utilities to improve their survivability in an earthquake.
Earthquake (LT5)	Ongoing		Improve local capabilities to perform earthquake building safety evaluations to conduct pre- and post-disaster assessments.
Earthquake	Ongoing		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
<b>Wind</b>			
Wind (LT10)	Ongoing		Increase and maintain public awareness of severe windstorms and the benefits of mitigation activities through education aimed at households and businesses.
Wind (ST1)	Deferred	Lack funding and staff availability	Develop and implement programs to keep trees from threatening lives, property and public infrastructure during windstorm events.
Wind (ST2)	Ongoing	Reg 1 2008 Debris Management plan	Develop and implement or enhance strategies for debris management and/or removal after windstorm events.
Wind (ST3)	Deleted	Remove Duplicated in ST1	Maintain tree trimming for aboveground power lines.
Wind (LT1)	Deferred	Lack funding and staff availability	Map and publicize locations around Yamhill County with the highest incidence of extreme windstorms.
Wind (LT2)	Deferred	Lack funding and staff	Support/encourage electrical utilities to use underground construction methods where

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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
		availability	possible to reduce power outages from windstorms.
Wind (LT3)	Deferred	Lack funding and staff availability	Increase public awareness of windstorm mitigation activities.
Wind (LT4)	Deferred	Lack funding and staff availability	Support/encourage contractors, homeowners and electrical utilities to use windstorm resistant construction methods where possible to reduce damage and power outages from windstorms.
Wind (LT5)	Deferred	Lack funding and staff availability	Develop and implement programs to keep trees from threatening lives, property and public infrastructure during windstorm events.
Wind (LT6)	Deferred	Lack funding and staff availability	Identify trees that are potentially susceptible to wind throw.
Wind (LT7)	Ongoing		Encourage all identified critical facilities to secure emergency power.
Wind (LT8)	Deferred	Lack funding and staff availability	Encourage harvesting of trees along utility and road corridors, preventing potential windstorm damage.
Wind (LT9)	Ongoing		Encourage harvesting of trees that are blown down during a windstorm.
<b>Drought</b>			
Drought	Ongoing	Oregon Water/Wastewater Agency Response Network (ORWARN)	Encourage coordination among municipalities for water issues.
Drought (ST1)	Ongoing		Support the technical services provided by county-based agencies on effective methods of water use curtailment.
Drought (ST2)	Ongoing	Study of inter-tie feasibility complete; Dayton/Lafayette tied	Encourage local governments to Inter-tie water systems. (studies done in 1997 and 2009)
Drought (LT1)	Ongoing		Support Soil and Water Conservation District and local water agencies training on water conservation measures to farmers and ranchers, including drought management practices for crops and livestock.
Drought (LT2)	Delete	Lack funding and staff	Support the technical service and low interest loans provided to farmers and ranchers so



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<b>Hazard / Priority</b>	<b>Status</b> <i>(Complete, Deferred, Deleted, Ongoing)</i>	<b>Comment</b>	<b>Description</b>
		availability	that they can develop livestock watering systems.
Drought (LT3)	Deferred	Lack funding and staff availability	Encourage storage of water, especially off stream storage.
Drought (LT4)	Deferred	Lack funding and staff availability	Support agencies determination of locations for additional aquifer studies that might lead to greater water supplies and help determine funding sources for the studies.
<b><i>Volcano</i></b>			
Volcano	Delete	will be resolved when iPAWS capable for ALL-hazards	Update public emergency notification procedures and develop an outreach program for ash fall events.
<b><i>Erosion</i></b>			
Erosion	<b><i>New</i></b>	Considered	Develop and provide information to citizens on riverbank erosion and methods to prevent it in an easily distributed format.

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## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The requirements for the evaluation and implementation of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of Yamhill County's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict Yamhill County's highest priority mitigation actions.

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

#### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment.

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***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

## **Jurisdictional Addenda Yamhill County**

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### ***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

### ***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

### ***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

### ***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan's five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin.

## Jurisdictional Addenda Yamhill County

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Update jurisdictional debris management plan		<i>Preventive &amp; implementation (partnerships)</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Region 1 Debris Mgmt Plan			
<b>Rationale for Proposed Action Item:</b>			
Last update in 2008 was regional			
<b>Ideas for Implementation:</b>			
Change to multi-hazard – remove from wind, (STZ) Winterstorm (LT2, 5TI), etc.			
<b>Coordinating Organization:</b>		EM	
<b>Internal Partners:</b>		<b>External Partners:</b>	
EM, PUB WKS		Benton, Marion, Polk, Linn, Lincoln County partners	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
			Ongoing Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	LAMB/EM		
<b>Action Item Status:</b>	New		

## Jurisdictional Addenda Yamhill County

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Develop labor & equipment tracking protocols for NH damage/disaster assessment information gathering.		<i>EM. Ops &amp; implementation</i>	
<b>Alignment with Existing Plans/Policies:</b>			
<b>Rationale for Proposed Action Item:</b>			
Need for information for disaster/emergency declarations and reimbursement			
<b>Ideas for Implementation:</b>			
Place in multi-hazard category			
<b>Coordinating Organization:</b>		Public Works	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Pub Works			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
		Existing staff	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>		LAMB/EM	
<b>Action Item Status:</b>		New	



## Jurisdictional Addenda Yamhill County

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Steering committee to prioritize Natural Hazard Mitigation Plan		<i>Implementation</i>	
<b>Alignment with Existing Plans/Policies:</b>			
2009 Multi-Hazard (5)/Multi-Hazard (14)			
<b>Rationale for Proposed Action Item:</b>			
We need a group of decision-makers to help prioritize and provide momentum to natural hazard mitigation. This could also address the goal of annual review of the plan. (MH-14)			
<b>Ideas for Implementation:</b>			
Involve a member of the Board of Commissioners Involve key Dept. Heads			
<b>Coordinating Organization:</b>		Emergency Management	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Board, Public Works, Public Health Emergency Mgt.			
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
		Use existing staff	<b>Ongoing</b> Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Friday/Planning		
<b>Action Item Status:</b>	New		

## Jurisdictional Addenda Yamhill County

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Determine critical bridge infrastructure – life line routes – water, sewer, power		<i>Emergency Operations</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Earthquake (LT2); Multi-Hazards (MH6)			
<b>Rationale for Proposed Action Item:</b>			
To focus future efforts to high priority sites/bridges. Priority list of bridges to be addressed first during hazard events			
<b>Ideas for Implementation:</b>			
Outreach efforts to get input from communities – what bridges are critical to their community & why is it critical Public health – hospital routes Coordination with state/county/cities to reach consensus on priority bridges Include results in Trans. Sys. Plan & other plans			
<b>Coordinating Organization:</b>		EM & PW	
<b>Internal Partners:</b>		<b>External Partners:</b>	
PW, Planning, Public Health, Emergency Man.		State (ODOT), Cities, Federal Highway, FEMA	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
Existing DOGAMI Corridor study Attempt to expand study Co. wide			Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	Gille/Engineer Public Works		
<b>Action Item Status:</b>	New		

## Jurisdictional Addenda Yamhill County

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Review, Assessment of Sewage Infrastructure		Preventative	
<b>Alignment with Existing Plans/Policies:</b>			
<b>Rationale for Proposed Action Item:</b>			
Can influence short and long term health impacts for communities			
<b>Ideas for Implementation:</b>			
Review of documentation for systems (cities) that exist with communities and DEQ (Oregon Department of Environmental Quality)			
<b>Coordinating Organization:</b>		Planning/Public Health	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Planning/Health (intern)		Oregon DEQ	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
		40 hours + expenses	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	Gary VanderVeen/Environmental Health		
<b>Action Item Status:</b>	New		

## Jurisdictional Addenda Yamhill County

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Build a cadre of community volunteers to form an Emergency Preparedness Speakers Bureau		<i>Education &amp; Outreach</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Multi-Hazard#10, 11, 12 (NHMP & Co. EOP)			
<b>Rationale for Proposed Action Item:</b>			
The rationale is that preparedness is an ongoing effort. The best way to address the problem with a revolving group of volunteers to help augment Emergency Management with the ability to give presentations.			
<b>Ideas for Implementation:</b>			
1.) write "job description" for speakers bureau 2.) Advertise and interview for members of Speakers Bureau 3.) Provide in-depth training for "SB" 4.) Maintain ongoing recruitment efforts. To maintain SB numbers			
<b>Coordinating Organization:</b>		Yamhill County Emergency Management	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Public Health		All (10) city governments	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
EM/PH general funds		Minimal, printing and materials costs.	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	Chris Shultz/EM-PH Community Preparedness Specialist		
<b>Action Item Status:</b>	New		

## **7.2 CITY OF AMITY**

This addendum contains the specific information about the City of Amity, Oregon to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section further describes the City of Amity's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Amity is located near the southern border of Yamhill County. The city's 2013 population was 1,610 residents. (PSU 2014) The U.S. Census's 2012 American Community Survey reported 5.4 percent of the population is under five years of age, 64.9 percent are between the ages of 18 and 64, and 7.2 percent of the population is 65 years or older. Of the City of Amity's 830 residents eligible for the labor force, 750 were employed, and the unemployment rate was 6.6 percent. The 2012 median household income was \$48,750 and the median family income was \$56,389. The City of Amity's per capita income in 2012 was \$20,353. Sixteen percent of families were living below the poverty level in 2012. In that same year, 18.6 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

## Jurisdictional Addenda City of Amity

### DMA 2000 Requirements: Planning Process

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

#### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Amity is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill the goal, the city organized a Hazard Mitigation Plan development Steering Committee dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats. Table 7.2-1 contains the City of Amity's Steering Committee participant list to augment the Yamhill County planning elements.

Table 7.2-1. City of Amity Steering Committee	
Name	Agency/Department/Affiliation
Larry Layton	City Administrator
Matt Johnson	Public Works Superintendent
Michael Cape	Mayor
Charles Eaton	City Engineer

Table 7.2-2 contains the summary of the city's public involvement and planning meeting activities.

Table 7.2-1. City of Amity Steering Committee	
Mechanism	Description
Newsletter Distribution	Posted at City Hall, Post Office, Library, Council Chambers
Public Meetings	City Council Public Hearing, September 3, 2014.

## CAPABILITY ASSESSMENT

Table 7.2-3, 7.2-4, and 7.2-5 contain the City's resources used to support planning activities, including the reports and studies reviewed as part of the update process.

<b>Table 7.2-3. City of Amity Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Amity Comprehensive Plan (1992/2003)	Guides community governance, delineates authority and responsibility, and defines development process.
	Water Master Plan	Highlights necessary improvements in the water system.
	Wastewater Master Plan	Highlights necessary improvements in the wastewater system.
	Amity Emergency Operations Plan	Provides a procedure for dealing with and minimizing damage from hazards and other emergencies.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	Provides for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency.
	Title 8.70 Hazardous Materials Releases	Provides procedure for coordination among various agencies in the event of hazardous material releases.
	City of Amity Development Code 2000	Defines development criteria and building regulations.
	Floodplain Ordinances	Delineates development, building codes, and land-use regulations.

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City of Amity**

**Table 7.2-4. City of Amity Administrative and Technical Resources for Hazard Mitigation**

<b>Staff/Personnel Resources</b>	<b>Department/Division Position</b>
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract-Jim Minard
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Contract-Mark Burrows, Burrows Consulting Services Inc
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	City Engineer
Floodplain manager	City Administrator
Personnel skilled in GIS and/or HAZUS-MH	None
Director of Emergency Services	None
Finance (grant writers, purchasing)	City Administrator
Public Information Officers	City Administrator/Mayor

**Table 7.2-5. City of Amity Financial Resources for Hazard Mitigation**

<b>Financial Resources</b>	<b>Effect on Hazard Mitigation</b>
General funds	Yes
Authority to levy taxes for specific purposes	Yes, with a vote of the people
Incur debt through general obligation bonds	Yes, with a vote of the people
Incur debt through special tax and revenue bonds	Yes
Incur debt through private activity bonds	Unsure
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding is available on an annual basis. This grant can be used to mitigate and protect repetitively flooded structures and infrastructure.
United State Fire Administration (USFA) Grants	Grants are available to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.



## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

#### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The City of Amity's Steering Committee determined the following hazards (identified with an X) could potentially threaten the community.

<i>Natural Hazards</i>	
Flood	X
Winter Storm	X
Landslide	
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	
Drought	X

## OVERVIEW OF VULNERABILITY ANALYSIS

This section summarizes community specific vulnerability information for the City of Amity to augment the MHMP development process. It consists of:

- Identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

## Jurisdictional Addenda City of Amity

### DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

#### Assessing Vulnerability: Overview

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### Element

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties

#### Assessing Vulnerability: Addressing Repetitive Loss Properties

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### Element

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Amity actively participates in FEMA's NFIP and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City of Amity's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.

### DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment

#### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## VULNERABILITY ANALYSIS

### Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

## **Jurisdictional Addenda City of Amity**

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.2-6A, 7.2-6B, and 7.2-7. Tables 7.2-8, 7.2-9, and 7.2-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Amity seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### **Population and Building Stock**

Population data listed in Section 7.2-6A were obtained from the 2000 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.2-6A, 7.2-6B, and 7.2-7.

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City of Amity**

<b>Table 7.2-6A. City of Amity Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>2</sup></b>	<b>Total Building Count</b>	<b>Total Value of Buildings (\$)</b>
1,478	1,480	1,610	495	\$69,056,129 <sup>1</sup>

Source: FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Yamhill county Taxing Districts: [http://www.co.yamhill.or.us/assessor/Documents/2013\\_Taxing\\_Districts.pdf](http://www.co.yamhill.or.us/assessor/Documents/2013_Taxing_Districts.pdf)

<sup>2</sup> Portland State University (PSU) 2014 Oregon Population Report.

<b>Table 7.2-6B. City of Amity NFIP Insurance Report</b>								
<b>City of</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>1</sup></b>
Amity	759	0	2	197,800	379.5	0	0	0

Source: FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>1</sup>Content and building claims.

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City of Amity**

(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, their locations have been %shaded+for publication. The data will remain in the report for the County's future mitigation planning efforts)

**Table 7.2-7. City of Amity Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	City Hall/ Court/ Amity Police	401 S. Trade or 109 Maddox Ave. (same location)	\$1,310,923.43
	Amity Fire District Station	700 S. Trade St.	\$2,500,000
	City of Amity	20000 Briedwell Rd	\$40,385
	Other Amity Assets		\$1,173,905
Government	Amity Public Works Department	401 E. 3rd St.	\$812,888
	Amity US Post Office	102 Woodson St.	\$500,000
Emergency Response	Amity Police	Inside City Hall Bldg	See Government Section
	Amity Fire District Station	700 S. Trade St.	See Government Section
Educational	Amity Preschool and Elementary School (A-5)	300 Rice Lane	\$9,107,827
	Amity Middle School (6-8)	115 Church St.	\$8,646,335
	Amity High School (9-12)	503 Oak St.	\$10,972,362
	Other School Assets		\$2,044,548
Community	Amity Cemetery	See map	
	Amity City Library	307 N. Trade St.	\$443,838
	Amity City Park	See map	Unknown
	Amity Assembly of God	310 Getchell St.	\$181,490
	Amity First Baptist Church	205 6th St.	Unknown
	Amity & McCabe United Methodist Churches	203 SE Nursery Ave	\$61,576
		23300 SW Walker Lane	Unknown
	Church of Christ	1305 Goucher St.	\$1,051,599
	Church of Jesus Christ of Latter Day Saints	18565 S Hwy 99 W	Unknown
	Assembly of God Church	708 S. Jellison St.	\$98,774
State and Federal Highways	Hwy 99W N/S 2 lane with sidewalk		Unknown
	Bellevue Hwy-2 lane no sidewalks		Unknown
	Amity Hopewell Hwy-2 lane with sidewalks		Unknown
Railroads	Willamette & Pacific (Freight Only) parallel Hwy 99	741 NE Third Street, McMinnville	Unknown
Bridges	Bridge on Hwy 99 just south city limits		Unknown
	Bridge on Bellevue Hwy just outside city limits		Unknown

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<b>Table 7.2-7. City of Amity Critical Facilities and Infrastructure</b>			
<b>Facility Type</b>	<b>Name / Number</b>	<b>Address</b>	<b>Value<sup>1</sup></b>
	Bridge on Amity Hopewell Hwy at City Limits		Unknown
Utilities	NW Natural Gas		Unknown
	Amity Water Treatment (South Yamhill River Source-built in 1969)		\$47,109
	Amity Waste Water Treatment (built in 1961)		\$3,500,000
	Amity Storm Drain System		Unknown
	City Sanitary & Recycling		Unknown
	Lift Stations (3)		Unknown
	Landfill-Riverbend Landfill		Unknown
	Telephone-Verizon		Unknown
	Cell Services-provided; no towers		Unknown
	PGE Electric		Unknown
	Comcast TV		Unknown
	AT&T Wireless		Unknown
	Cricket DMT Wireless		Unknown
	Go Wireless Inc.		Unknown

**Sources:** City of Amity

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup> Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

## Vulnerability Analysis

The vulnerability analysis development process is discussed in the Yamhill County MHMP, Section 6, which generated the following Hazard Exposure Analysis Overviews. Tables 7.2-8, 7.2-9, and 7.2-10 present, in tabular form, results obtained from the GIS analysis depicted in hazard figures located in Appendix A.

Table 7.2-8. City of Amity Potential Hazard Exposure Analysis Overview-Population and Buildings							
			Population Number	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology		Number	Value (\$) <sup>1</sup>	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain		*	*	*	*
	High	100-year floodplain		*	*	*	*
Winter Storm		descriptive	1,610	495	\$69,056,129	*	*
Wildland Fire	Moderate	Moderate fuel rank		*	*	*	*
	High	High fuel rank		*	*	*	*
	Very High	Very high fuel rank		*	*	*	*
	Extreme	Extreme fuel rank		*	*	*	*
Earthquake	Strong	9-20% (g)		*	*	*	*
	Very strong	>20-40% (g)		*	*	*	*
	Severe	>40-60% (g)		*	*	*	*
Wind		descriptive	1,610	495	\$69,056,129	*	*
Drought		descriptive	1,610	--	--	--	--
Volcano		descriptive	1,610	495	\$69,056,129	*	Unknown

<sup>1</sup>Estimated and/or insured structural value. Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$112,700 per structure). \*Note-population and buildings by parcel or census block data was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed.

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**Table 7.2-9. City of Amity Potential Hazard Exposure Analysis Overview-Critical Facilities**

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	1	9.1M	--	--	2	1M
	High	100-year floodplain	--	--	--	--	1	8.6M	--	--	4	1M
Winter Storm		Descriptive	5	3.8M	1	1.3M	4	31M	--	--	10	1.9M
Wildland Fire	Moderate	Moderate fuel rank	4	2.7M	1	1.3M	3	28.7M	--	--	10	1.9M
	High	High fuel rank	1	40K	--	--	2	19.6M	--	--	6	1M
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	5	3.8M	1	1.3M	4	31M	--	--	10	1.9M
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Wind		Descriptive	5	3.8M	1	1.3M	4	31M	--	--	10	1.9M
Drought		Descriptive	--	--	--	--	--	--	--	--	--	--
Volcano		Descriptive	5	3.8M	1	1.3M	4	31M	--	--	10	1.9M

(1) Values may not be available for all facilities.



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**Table 7.2-10. City of Amity Potential Hazard Exposure Analysis Overview-Critical Infrastructure**

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	1	unkno wn	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	3	unkno wn	--	--	2	unkno wn	--	--
Winter Storm		descriptive	3	unkno wn	1	unkno wn	3	unkno wn	--	--	14	1M	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	3	unkno wn	--	--	10	1M	--	--
	High	High fuel rank	--	--	--	--	2	unkno wn	--	--	3	47K	--	--
	Very High	Very high fuel rank	--	--	--	--	1	unkno wn	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	3	unkno wn	1	unkno wn	3	unkno wn	--	--	14	1M	--	--
	Very strong	20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Wind		descriptive	3	unkno wn	1	unkno wn	3	unkno wn	--	--	14	1M	--	--
Drought		descriptive	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		Descriptive	3	Unkn own	3	Unkn own	3	Unkn own	--	--	14	1M	--	--

## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the City of Amity's vulnerabilities and impacts from natural hazards identified in the 2014 Yamhill County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Amity. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

In the City of Amity, one educational facility (worth \$8.6M), four community facilities (worth \$1M), three bridges (value unknown) and two utilities (value unknown) are within the boundaries of the 100-year floodplain.

One educational facility (worth \$9.1M), two community facilities (worth \$1M), and one bridge (value unknown) is located within the 500-year floodplain.

### ***Winter Storm***

The ice, cold temperatures, high winds and floods accompanying winter storms can cause widespread impacts. Damage to facilities and infrastructure can be severe depending on the intensity of the storm event.

Since winter storms are regional events, the entire City of Amity can be equally affected. Therefore the entire population (1,610 residents), 495 residential structures (value \$69.1M), five government facilities (value \$6.3M), two emergency response facilities (value \$3.8M), four educational facilities (value \$31M), 10 community facilities (value \$1.9M), three highway and one rail segment (value unknown), three bridges (value unknown), and 14 utilities (value \$4M) are at risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Risk levels of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Amity has critical facilities and infrastructure located within areas of moderate, high and very high risk. Moderate risk areas contain four government facilities (worth \$5.2M), one emergency response facility (value unknown), three educational facilities (worth \$28.7M), ten community facilities (worth \$1.8M), three bridges (value unknown) and ten utilities (worth \$4.5M).

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High risk areas contain one government facility (worth \$40K), two educational facilities (worth \$19.6M), six community facilities (worth \$1M), two bridges (value unknown) and three utilities (worth \$47K).

Very high risk areas contain one bridge (value unknown).

#### ***Earthquake***

Based on Peak Ground Acceleration (PGA) shake maps produced by the U.S. Geologic Survey, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. In addition to landslides, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Amity is in the eastern portion of Yamhill County in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake. A strong designation corresponds to 9 to 20 percent of the acceleration of gravity.

All areas within the City of Amity are equally at risk of an earthquake and are located in the strong shaking zone (9-20% g). Therefore the entire population (1610 residents), 495 residential structures (value \$69.1M), five government facilities (value \$3.8M), one emergency response facility (value \$3.8M), four educational facilities (value \$31M), 10 community facilities (value \$1.9M), three highway and one rail segment (value unknown, three bridges (value unknown, and 14 utilities (value \$4M) are at risk.

#### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Amity are equally at risk of a windstorm event. Therefore the entire population (1,610 residents), 495 residential structures (value \$69.1M), five government facilities (value \$6.3M), two emergency response facilities (value \$3.8M), four educational facilities (value \$31M), 10 community facilities (value \$1.9M), three highway and one rail segment (value unknown, three bridges (value unknown, and 14 utilities (value \$4M) are at risk.

#### ***Drought***

State-wide droughts have historically occurred in Oregon. The region-wide phenomenon presents risks equally to all residents. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to Amity's local economy such as agriculture, fishing, and timber have historically been affected. Future droughts would have tangible economic and potentially human impacts.

***Volcano***

Ashfall or tephra from volcanic activity is most likely to impact Yamhill County and the City of Amity. Damage is likely to result from volcanic eruption columns and clouds containing volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat and can distribute acid rain as sulfur dioxide gas mixes with water. Because carbon dioxide is heavier than air and collect in valleys and depressions, humans and animals are threatened by the risk of suffocation. Fluorine clings to ash particles and can poison grazing livestock and contaminate domestic water supplies.

It is impossible to predict the location or extent of future events with any probability. Therefore 1,610 residents, 495 residential structures (value \$69.1M), five government facilities (value \$3.8M), one emergency response facility (value \$1.3M), four educational facilities (value \$31M), ten community facilities (value \$1.9M), three highway segments (value unknown), three bridges (value unknown), and 14 utilities (value \$1M) are at risk.

**MITIGATION STRATEGY**

**IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

**DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

**Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

**Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Section 7.2-11, or to revise them to more fully meet the city's needs. The committee proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects used to achieve the goals of a mitigation plan. Table 7.2-12 depicts the city's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.2-12 delineate those actions the city will strive to implement within this five year planning cycle.

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### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

#### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

#### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City of Amity actively participates in FEMA's NFIP and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City of Amity's Mitigation Strategy identified and analyzed potential flood mitigation actions to fulfill NFIP initiatives, specifically addressing RL properties. They subsequently selected and prioritized city appropriate actions to assure an effective flood mitigation program.

**MITIGATION GOALS AND ACTION ITEMS CONSIDERED**

<b>Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
<b>7</b>	DEVELOPMENT <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

**DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions**

**Local Planning Updates and Revisions**

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

**Element**

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

Source: FEMA, March 2013.

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**Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	Ongoing	We use state building codes	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing	We use state codes	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable). New construction is required to anchor by code.
MH	Ongoing	We use state building codes	Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH	Ongoing	Ongoing	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing	In place	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	Ongoing	In place	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	Ongoing	Ongoing	Install lightening rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing	Ongoing	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Ongoing	Ongoing	Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Ongoing	Ongoing	Identify and pursue funding opportunities to implement mitigation actions.
MH	Ongoing	Ongoing	Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
<b>Flood</b>			
Flood	Ongoing	In place	Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Ongoing	Ongoing	Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.

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**Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Flood	Ongoing	In place	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Ongoing	On going	Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Ongoing	In place	Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	Ongoing	In place	Develop, implement, and enforce floodplain management ordinances.
Flood	Ongoing	On going	Develop outreach program to educate residents concerning flood proofed well and sewer/septic installation.
Flood	Ongoing	Ongoing	Acquire, relocate, elevate, or otherwise flood-proof identified properties.
Flood	Ongoing	Ongoing	Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing	In place	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing	Ongoing	Construct earthen berms to divert flood flows into bridge or culvert openings. The earth fill should be erosion-resistant and the berms should be covered with erosion-resistant fabric, armoring materials, or vegetation.
Flood	Ongoing	Ongoing	Increase culvert size to increase its drainage efficiency.
Flood	Ongoing	Ongoing	Isolate and improve existing wastewater system that currently has poor hydraulic gradient
Flood	Ongoing	Ongoing	Create high water overflow conveyance systems.
Flood	Ongoing	Ongoing	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Ongoing	Ongoing	Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood	Ongoing	Ongoing	Relocate wastewater lift stations (2) outside of the 100-year floodplain
Flood	Ongoing	Ongoing	Develop and implement flood risk reduction program and outreach efforts considering upstream storage, channel improvements, and flood walls or levee construction.
<b>Winter Storm</b>			
Winter Storm	Ongoing	In place	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm	Ongoing	Ongoing	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Ongoing	In place	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm	Ongoing	Ongoing	Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.



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**Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Winter Storm	Ongoing	Ongoing	Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storm	Ongoing	Ongoing	Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
Winter Storm	Ongoing	Ongoing	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storm	Ongoing	In place	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Ongoing	Ongoing	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
<b>Landslide</b>			
Landslide	Delete	None threatened	Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Delete	None threatened	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	Delete	None threatened	Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	Delete	None threatened	Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	Delete	None threatened	Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Delete	None threatened	Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.
Landslide	Delete	None threatened	Identify and seasonally restrict recreational and construction activities in high landslide areas.
Landslide	Delete	None threatened	Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
<b>Wildland Fire</b>			
Wildland Fire	Ongoing	Ongoing	Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Ongoing	Ongoing	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	Ongoing	Ongoing	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	Ongoing	Ongoing	Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.

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**Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
<b>Earthquake</b>			
Earthquake	New		Retrofit important public facilities with significant seismic vulnerabilities
Earthquake	New		Retrofit bridges that are not seismically adequate
Earthquake	Ongoing	Ongoing	Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Ongoing	Ongoing	Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Ongoing	Ongoing	Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing	In place	Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing	In place	Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing	In place	Inspect and/or certify all new construction.
Earthquake	Ongoing	Ongoing	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing	Ongoing	Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	Ongoing	Ongoing	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Ongoing	Ongoing	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing	Ongoing	Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<b>Volcano</b>			
Volcano	Ongoing	Ongoing	Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Ongoing	Ongoing	Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Ongoing	Ongoing	Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
Volcano	Ongoing	Ongoing	Evaluate ash impact on storm water drainage system and develop mitigation actions.
<b>Wind</b>			

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**Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Wind	Ongoing	In place	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable). All new construction is required to follow current codes.
Wind	Ongoing	Ongoing	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing	Ongoing	Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.

## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of the City of Amity's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Amity's highest priority mitigation actions.

## MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Amity reviewed the Yamhill County goals and determined they suit the City's needs and subsequently adopted the Goals in Table 7.2-13 for the current planning period.

<b>Table 7.2-13 City of Amity Mitigation Goals</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the City, county and other local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in the City of Amity.
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

#### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment.

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***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

## **Jurisdictional Addenda City of Amity**

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Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### ***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

### ***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

### ***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

### ***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan's five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin.



## Jurisdictional Addenda City of Amity

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Retrofit important public facilities with significant seismic vulnerabilities		<i>Preventative county goal; state goals 1 &amp; 2</i>	
<b>Alignment with Existing Plans/Policies:</b>			
The city has a plan to upgrade our current community center with masonry walls to current seismic standards.			
<b>Rationale for Proposed Action Item:</b>			
The current unreinforced masonry building used for community center and city offices is a significant life and health hazard for city employees and visitors as well as community center visitors. We need to mitigate the risk.			
<b>Ideas for Implementation:</b>			
Seek grants for reinforcing masonry walls.			
<b>Coordinating Organization:</b>		Public Works	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City council and staff		OR state Infrastructure Financing Authority	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
CDBG		\$1 million	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	L. Layton		
<b>Action Item Status:</b>	New		

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Retrofit bridges that are not seismically adequate		County preventative; state goals 1 & 2	
<b>Alignment with Existing Plans/Policies:</b>			
ODOT bridge west of city is high priority to retrofit and repair. City used bridge to suspend only waterline into city from intake.			
<b>Rationale for Proposed Action Item:</b>			
ODOT has prioritized upgrades to the bridge to protect lives and maintain evacuation routes. The city needs to upgrade the connection between the bridge and the waterline suspended from it.			
<b>Ideas for Implementation:</b>			
Work with ODOT to ensure bridge upgrade and then find funding to upgrade our line or bore new line beneath river.			
<b>Coordinating Organization:</b>		Public Works	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Public works department		ODOT	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
CDBG Water/wastewater funding		\$800k	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	L. Layton		
<b>Action Item Status:</b>	New		

### 7.3 CITY OF DAYTON

This addendum contains information about the City of Dayton, Oregon in support of the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section describes the City of Dayton's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

#### COMMUNITY DESCRIPTION

The City of Dayton is located in central Yamhill County. The city's 2013 population was 2,550 residents. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 10.6 percent of the population is under five years of age, 55.8 percent are between the ages of 18 and 64, and 10.8 percent of the population is 65 years or older. Of the City of Dayton's 1,236 residents eligible for the labor force, 988 were employed, and the unemployment rate was 13.8 percent. The 2012 median household income was \$44,929, and the median family income was \$54,259. The City of Dayton's per capita income in 2012 was \$16,691. Eleven and six-tenths percent of families were living below the poverty level in 2012. In that same year, 15.1 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### DMA 2000 Requirements: Planning Process

##### Planning Process

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### Element

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### Documentation of the Planning Process

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### Element

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

## Jurisdictional Addenda City of Dayton

### DMA 2000 Requirements: Planning Process

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

#### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Dayton is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill the goal, the city organized a MHMP development Steering Committee dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 7.3-1 contains the City of Dayton Steering Committee participant list to augment the Yamhill County MHMP planning elements.

Table 7.3-1. City of Dayton Steering Committee	
Name	Agency/Department/Affiliation
Scott Pingel	City Manager (3/11/13 to present)
Christy Ellis	Previous City Manager 3/2/09 to 12/31/12
Ross Schultz	Previous City Manager 10/08 to 3/09
Elizabeth Wytoski	Mayor
Steve Sagmiller	Public Works

Table 7.3-2 contains the summary of the City of Dayton's public involvement and planning meeting activities.

Table 7.3-2. City of Dayton Public Involvement Mechanisms	
Mechanism	Description
Newsletter	Distribution with May/June 2014 Dayton School District newsletter to introduce project and show timeline for public participation.
Community Calendar	Distribution with utility bills in June 2014 to introduce and provide project updates and to show timeline for public participation
City Council Public Hearing	The City Council will hold a public hearing on June 16 <sup>th</sup> for the purpose of receiving comments from the public regarding the updated NHMP
City Website	The updated plan will be posted to the City's website at <a href="http://www.ci.dayton.or.us">www.ci.dayton.or.us</a> for review as information is updated and becomes available

## CAPABILITY ASSESSMENT

Table 7.3-3, 7.34, and 7.35 contain the City of Dayton's resources used to support planning activities, including reports and studies reviewed as part of the update process.

<b>Table 7.3-3. City of Dayton Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Comprehensive Land Use	Guides development in Dayton-Plan for Growth (May 1979, Updated and Adopted December 1986)
	Transportation Plan	Guides internal traffic flow and state and county road traffic flow
	Parks Plan	Guides development of current parks and future parks
	Downtown Development Plan	Encourages and guides downtown development
	Water System Master Plan	Finalized in 2010 guides water infrastructure improvements
	Sewer System Master Plan (Wastewater Facilities Plan)	Finalized in 2011 guides wastewater infrastructure improvements
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	Wetlands	No official program, but do consider effects on wetlands from development during planning
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	Provides for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency.
	Title 8.70 Hazardous Materials Releases	Provides procedures for coordination among various agencies in the event of hazardous materials releases.
	Land Use and Development Code	Defines development criteria and building regulations (2007)
	Floodplain Ordinances	Delineates development, building codes, and land-use regulations
	Water and Sewer Codes	Related to construction
	Public Works Standards	Related to construction

**Jurisdictional Addenda  
City of Dayton**

**Table 7.3-4. City of Dayton Administrative and Technical Resources for Hazard Mitigation**

<b>Staff/Personnel Resources</b>	<b>Department/Division Position</b>
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract-Mid Willamette Valley Council of Governments
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	City Engineer-Westech Engineering Inc.
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	City Engineer-Westech Engineering Inc.
Floodplain manager	Scott Pingel - City Manager
Personnel skilled in GIS and/or HAZUS-MH	City Engineer-Westech Engineering Inc.
Director of Emergency Services	Yamhill County
Finance (grant writers, purchasing)	Purchasing in house (all department heads); occasionally hire grant writers (various) and Mid Willamette Valley Council of Governments
Public Information Officers	City Manager

**Table 7.3-5. City of Dayton Financial Resources for Hazard Mitigation**

<b>Financial Resources</b>	<b>Effect on Hazard Mitigation</b>
General funds	Limited, Yes
Authority to levy taxes for specific purposes	Yes, with voter approval
Incur debt through general obligation bonds	Yes
Incur debt through special tax and revenue bonds	Yes
Incur debt through private activity bonds	Likely no
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000, and its implementing regulations.

### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

#### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The City of Dayton's Steering Committee determined the following hazards could potentially threaten the community. Those identified with an (x) are specific to the City of Dayton.

<i>Natural Hazards</i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano*	X
Wind	X
Erosion*	X
Drought	X

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for the City of Dayton to augment the MHMP development process. It includes:

- Identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Dayton actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The city's mitigation strategy identified and analyzed potential flood mitigation actions to fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.



**DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment**

**Assessing Vulnerability: Multi-Jurisdictional Risk Assessment**

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

**Element**

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

**VULNERABILITY ANALYSIS: SPECIFIC STEPS**

**Asset Inventory**

An asset inventory is the first step of a vulnerability analysis. Assets within the City of Dayton potentially affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.3-6A, 7.3-6B, and 7.3-7. Tables 7.3-8, 7.3-9, and 7.3-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Dayton seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development to the extent the law will allow, buildings, infrastructure, and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

**Population and Building Stock**

Population data listed in Table 7.3 - 6A below were obtained from the 2000 U.S. Census and Portland State University. It includes census block level data and estimates from university conducted community research.

The City of Dayton's existing building and infrastructure and insured values are identified in Tables 7.3-6A, 7.3-6B, and 7.3-7.

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<b>Table 7.3-6A. City of Dayton Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>2</sup></b>	<b>Total Building Count</b>	<b>Total Value of Buildings (\$)</b>
2,119	2,280	2,550	728	101,880,000 <sup>1</sup>

Source: FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Yamhill county Taxing Districts: [http://www.co.yamhill.or.us/assessor/Documents/2013\\_Taxing\\_Districts.pdf](http://www.co.yamhill.or.us/assessor/Documents/2013_Taxing_Districts.pdf)

<sup>2</sup> Portland State University (PSU) 2013 Oregon Population Report.

<b>Table 7.3 -6B.City of Dayton NFIP Insurance Report</b>								
<b>City of</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>2</sup></b>
Dayton	1996	0	5	819,400	399.20	0	0	0

Source: FEMA NFIP Insurance Report June 23, 2008  
FEMA SQANet.

<sup>2</sup>Content and building claims.

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(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, their locations have been %shaded+for publication. The data will remain in the report for the County's future mitigation planning efforts)

<b>Table 7.3-7. City of Dayton Critical Facilities and Infrastructure</b>			
<b>Facility Type</b>	<b>Name / Number</b>	<b>Address</b>	<b>Value<sup>1</sup></b>
Government	City Hall	416 Ferry St.	\$688,568
	Community Center (City Hall Annex)		\$657,281
	Public Works Shops	416 Ferry St., Dayton	\$146,091
	US Post Office	530 Ferry Street	\$350,000
	City Streets		\$7,000,000
Emergency Response	Fire District Office		\$3,000,000
	County Sheriff Sub-Station	(Inside Annex Bldg)	\$50,000
	Dayton Head Start	528 Ferry St.	\$50,000
Educational	Dayton Elementary School	526 Ferry St.	\$6,687,547
	Dayton Middle/Junior High School	801 Ferry St.	\$731,931
	Dayton High School	801 Ferry St.	\$4,486,769
	Berry Adult Care Facility for handicap and mentally disabled		\$500,000
Health Care	Palmer Creek Apts - 8 unit facility of elderly and handicap	206 Mill Street	\$2,000,000
	Farm Worker Housing (Fresa Park)	955 Ferry St.	\$500,000
Community	11 <sup>th</sup> St. Park	11 <sup>th</sup> & Church Street	\$300,000
	Alderman Park	SE Kreder Rd& Yamhill River	\$300,000
	Park-Courthouse Square Park (restrooms, playground, covered picnic area, bandstand, historic blockhouse, fountain	3 <sup>rd</sup> , 4 <sup>th</sup> , Main & Ferry	\$210,000
	The Dayton Pioneer Church	300 4th St.	Unknown
	First Baptist Church	300 Flower Lane	Unknown
	Dayton Christian Church	302 5th St.	Unknown
	San Martin Catholic Church	405 Ferry St.	Unknown
	Church of Christ of Latter Day Saints	700 Ash St.	Unknown
	Jehovah's Witness	16985 SE Neck Rd	Unknown
	Makinster Mae's Mosgrove	304 5th St.	Unknown

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**Table 7.3-7. City of Dayton Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Community	Hopewell Community Church	21500 SE Church Rd	\$166,970
	Full Gospel Assembly Church	411 Oak St.	\$171,827
	Cross Grace	406 Church St.	\$35,694
	Mary Gilkey Public Library	(Inside City Hall)	\$500,000
State and Federal Highways	Hwy 155		½ Mile
	Hwy 221		In Town
	Hwy 18	Adjacent to City Limits	½ Mile
Bridges	Foot Bridge (wooden suspension bridge)-carries water & sewer lines		\$4-6,000,000
	Hwy 221 Bridge		\$15,000,000
	Overpass at Hwy 18		\$15,000,000
Utilities	Nextel Wireless company		Unknown
	Verizon Telephone		Unknown
	Lift station #1		\$250,000
	Lift station #2		\$250,000
	Lift station #3		\$250,000
	Lift station #4		\$250,000
	Sewer Lagoon #1, chlorination & dechlorination building		\$1,250,000
	Sewer Lagoon #2, chlorination & dechlorination building		\$1,250,000
	Sewer Lagoon #3, chlorination & dechlorination building		\$1,250,000
	Sewer Lagoon #4, chlorination & dechlorination building		\$1,250,000
	Sewer Lagoon #5, chlorination & dechlorination building		\$1,250,000

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**Table 7.3-7. City of Dayton Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Breyman Watershed:		\$2,000,000
	Reservoir 1 (open concrete reservoirs <100,000 gal)		\$500,000
	Reservoir2 (open concrete reservoirs <100,000 gal)		\$500,000
	1 steel reservoir 980,000 gal		\$500,000
	1 below ground concrete reservoir (300,000 gal)		\$1,000,000
	1 slow sand filter; chlorination bldg pressure reducing valve		\$1,000,000
	Enclosed Water Tank 1.5 mil gallons		\$625,000
Utilities	8 Community Potable Water Wells		\$200,000 ea
	Breyman Springs-12		\$1,200,000
	Comcast Cable Television		Unknown
	Landfill (Riverbend in county)		Unknown
	Water Treatment Facility		\$3,000,000
	Portland General Electric McMinnville Water & Light		Unknown

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

## Vulnerability Analysis

The vulnerability analysis development process is discussed in the Yamhill County MHMP, Section 6. The following Hazard Exposure Analysis Overviews were generated based on the process. Tables 7.3-8, 7.3-9, and 7.3-10 depict in tabular form results obtained from the GIS analysis shown in the hazard figures located in Appendix A.

**Table 7.3-8. City of Dayton Potential Hazard Exposure Analysis Overview-Population and Buildings**

			Population Number	Buildings			
				Residential		Non-Residential	
Hazard Type	Hazard Area	Methodology	Number	Number	Value (\$) <sup>1</sup>	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	274	38,360,000	--	--
	High	100-year floodplain	--	227	31,780,000	--	--
Winter Storm		descriptive	2550	728	101,880,000	1	Unknown
Landslide	Moderate	14-32 degrees	--	390	54,600,000	--	--
	High	>32 degrees	--	185	25,900,000	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	728	101,880,000	1	Unknown
	High	High fuel rank	--	439	61,460,000	--	--
	Very High	Very high fuel rank	--	126	17,640,000	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--
Earthquake	Strong	9-20% (g)	2,550	728	101,880,000	1	Unknown
	Very strong	>20-40% (g)	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--
Volcano		descriptive	2,550	728	101,880,000	1	Unknown
Wind		descriptive	2,550	728	101,880,000	1	Unknown
Erosion		300øbuffer	--	--	--	--	--
Drought		descriptive	--	--	--	--	--

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$120,000 per structure). Note-population by parcel was not available at the time this document was prepared. 0.25 mile-buffered EHS sites were not able to be calculated due to the use of census block level data. Once this data is available, a useful analysis of population and residential structures by hazard can be completed.

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**Table 7.3-9. City of Dayton Potential Hazard Exposure Analysis Overview-Critical Facilities**

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)	No.	Value (\$)
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	1	2M	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	1	unknown
Winter Storm		descriptive	5	8.9M	2	3M	4	12M	2	2.5M	15	2.2M
Landslide	Moderate	14-32 degrees	1	350K	1	3M	2	6.7M	2	2.5M	5	839K
	High	>32 degrees	--	--	--	--	--	--	1	2M	1	167K
Wildland Fire	Moderate	Moderate fuel rank	4	1.8M	2	3M	4	11.9M	2	2.5M	15	2.2M
	High	High fuel rank	3	1.5M	2	3M	4	11.9M	2	2.5M	10	1.7M
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	5	8.9M	2	3M	4	12M	2	2.5M	15	2.2M
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	5	8.9M	2	3M	4	12M	2	2.5M	15	2.2M
Wind		descriptive	5	8.9M	2	3M	4	12M	2	2.5M	15	2.2M
Erosion		300øbuffer	3	1.5M	2	3M	1	6.7M	1	2M	4	972K
Drought		descriptive	--	--	--	--	--	--	--	--	--	--

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**Table 7.3-10. City of Dayton Potential Hazard Exposure Analysis Overview-Critical Infrastructure**

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	3	36M	--	--	9	7M	--	--
	High	100-year floodplain	--	--	--	--	3	36M	--	--	4	750K	--	--
Winter Storm		descriptive	1	unknown	--	--	3	36M	--	--	24	19.5M	--	--
Landslide	Moderate	14-32 degrees	--	--	--	--	2	30M	--	--	14	10.8M	--	--
	High	>32 degrees	--	--	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	3	36M	--	--	21	17.6M	--	--
	High	High fuel rank	--	--	--	--	3	36M	--	--	21	17.6M	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	2	250K	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1	unknown	--	--	3	36M	--	--	24	19.5M	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	1	unknown	--	--	3	36M	--	--	24	19.5M	--	--
Wind		descriptive	1	unknown	--	--	3	36M	--	--	24	19.5M	--	--
Erosion		300øbuffer			--	--	3	36M	--	--	3	750K	--	--
Drought		descriptive	1	unknown	--	--	3	36M	--	--	24	19.5M	--	--



## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards identified in the 2014 Yamhill County MHMP.

These assessments were performed using the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA Flood Insurance Rate Maps (FIRMs) were used to outline the 100-year and 500-year floodplains for the City of Dayton. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

In the City of Dayton, 227 residential structures (worth \$31.8M), one community facility (value unknown), three bridges (worth \$36M), and four utilities (worth \$750K) are located within the boundaries of the 100-year floodplain.

There are 274 residential structures (worth \$38.4M), one care facility (worth \$2M), three bridges (worth \$36M), and nine utilities (worth \$7M) found within the boundaries of the 500-year floodplain.

### ***Winter Storm***

Winter storms have widespread impacts resulting from ice, cold, high winds and flooding. Damage to facilities and infrastructure can be severe depending on the intensity of the storm event.

Since winter storms are regional events, the entire City of Dayton can be equally affected. Therefore 2,550 residents, 728 residential structures (value \$101.9M), one non-residential structure (value unknown), five government facilities (value \$8.9M), two emergency response facilities (value \$3M), four educational facilities (value \$12M), two care facilities (value \$2.5M), 15 community facilities (value \$2.2M), one highway segment (value unknown), three bridges (value \$36M), and 24 utilities (value \$19.5M) are at risk.

### ***Landslide***

The potential impacts from landslides can be widespread. Debris flows and landslides can impact transportation and rail routes, utility systems, and water and wastewater treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts vary from minor cleanup to more extensive utility system reconstruction. Utility disruptions are usually local and terrain dependent, and sometimes require reestablishing electrical power, communication, and gas pipeline connections at breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and wastewater may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability at the water and wastewater treatment plants.

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U.S. Geologic Survey (USGS) elevation datasets were used to determine the landslide hazard areas within the City of Dayton. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Using these guidelines, the City of Dayton has 390 residential structures (worth \$54.6M), one government facility (worth \$350K), two educational facilities (worth \$6.7M), one emergency response facility (worth \$3M), two care facilities (worth \$2.5M), five community facilities (worth \$839K), two bridges (worth \$30M), and 14 utilities (worth \$10.8M) located in areas of moderate risk.

There are 185 residential structures (worth \$25.9M), one care facility (worth \$2M), one community facility (worth \$167K), and two utilities (worth \$250K) located within areas of high risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Dayton has critical facilities and infrastructure located within areas with moderate, high, and very high fuel ranks. Moderate fuel rank areas contain 728 residential structures (worth \$101.9M), one non-residential structure (value unknown), four government facilities (worth \$1.8M), two emergency response facilities (worth \$3M), four educational facilities (worth \$11.9M), two care facilities (worth \$2.5M), 15 community facilities (worth \$2.2M), three bridges (worth \$36M), and 21 utilities (worth \$17.6M).

High fuel rank areas contain 439 residential structures (worth \$61.5M), three government facilities (worth \$1.5M), two emergency response facilities (worth \$3M), four educational facilities (worth \$11.9M), two care facilities (worth \$2.5M), ten community facilities (worth \$1.7M), three bridges (worth \$36M), and 21 utilities (worth \$17.6M).

Very high fuel rank areas contain 126 residential structures (worth \$17.6M) and two utilities (worth \$250K).

### ***Earthquake***

Based on Peak Ground Acceleration (PGA) shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas is likely to cause damage to weak, unreinforced masonry buildings and to induce small landslides along unstable slopes. Earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Dayton is in the eastern portion of Yamhill County, in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake. A strong designation corresponds to 9 to 20 percent of the acceleration of gravity.

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The entire City of Dayton can be equally affected. Therefore 2,550 residents, 728 residential structures (value \$101.9M), one non-residential structure (value unknown), five government facilities (value \$8.9M), two emergency response facilities (value \$3M), four educational facilities (value \$12M), two care facilities (value \$2.5M), 15 community facilities (value \$2.2M), one highway segment (value unknown), three bridges (value \$36M), and 24 utilities (value \$19.5M) are at risk of strong shaking earthquakes.

### ***Volcano***

Ashfall or tephra from volcanic activity is most likely to impact Yamhill County and the City of Dayton. Damage is likely to result from volcanic eruption columns and clouds containing volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat and can distribute acid rain as sulfur dioxide gas mixes with water. Because carbon dioxide is heavier than air and collect in valleys and depressions, humans and animals are threatened by the risk of suffocation. Fluorine clings to ash particles and can poison grazing livestock and contaminate domestic water supplies.

It is impossible to predict the location or extent of future events with any probability. Therefore 2,550 residents, 728 residential structures (value \$101.9M), one non-residential structure (value unknown), five government facilities (value \$8.9M), two emergency response facilities (value \$3M), four educational facilities (value \$12M), two care facilities (value \$2.5M), 15 community facilities (value \$2.2M), one highway segment (value unknown), three bridges (value \$36M), and 24 utilities (value \$19.5M) are at risk.

### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Dayton are equally at risk of a windstorm event. Therefore 2,550 residents, 728 residential structures (value \$101.9M), one non-residential structure (value unknown), five government facilities (value \$8.9M), two emergency response facilities (value \$3M), four educational facilities (value \$12M), two care facilities (value \$2.5M), 15 community facilities (value \$2.2M), one highway segment (value unknown), three bridges (value \$36M), and 24 utilities (value \$19.5M) are at risk.

### ***Erosion***

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available. Descriptions of several localized areas potentially susceptible to erosion were identified during the development of this document. These areas are identified by map location and reference the river or stream reach described. Critical facilities at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

Three government facilities (worth \$1.5M), two emergency response facilities (worth \$3M), 1 care facility (worth \$2M), one educational facility (worth \$6.7M), four community facilities

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(worth \$972K), three bridges (worth \$36M), and three utilities (worth \$750K) were identified in the City of Dayton to be at risk from erosion impacts.

### ***Drought***

State-wide droughts have historically occurred in Oregon. The region-wide phenomenon can impact all residents equally. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the City of Dayton's local economy such as agriculture, fishing, and timber have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

## **MITIGATION STRATEGY**

### **IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

#### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

##### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.3-11, or to revise them to more fully meet the City of Dayton's needs. The committee then evaluated potential mitigation actions.

Mitigation actions are activities, measures, or projects used to achieve the goals of a mitigation plan. Table 7.3-12 shows Dayton's considered mitigation actions developed during this mitigation planning process. The revised list in Table 7.3-13 delineates those goals the city wishes to adopt, and Table 7.3 -14 shows the actions the city will strive to implement within this five-year planning cycle.

#### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

##### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

##### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

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The City of Dayton actively participates in FEMA's NFIP and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City of Dayton's Mitigation Strategy identified and analyzed potential flood mitigation actions to fulfill NFIP initiatives, specifically addressing RL properties. They subsequently selected and prioritized city appropriate actions to assure an effective flood mitigation program

### MITIGATION GOALS AND ACTION ITEMS CONSIDERED

Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered	
Goal Number	Goal Description
1	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
7	DEVELOPMENT <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

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### **DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions**

#### **Local Planning Updates and Revisions**

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

#### **Element**

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

Source: FEMA, March 2013.

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**Table 7.3-12. City of Dayton Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	New		Evaluate and harden public infrastructure crossing bridges or rivers
MH	New		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.
MH	New		Identify and prioritize all "jurisdiction-owned" and "non-jurisdiction owned" critical facilities that have backup power and emergency operations plans.
MH	Ongoing	Ongoing	Continue to enforce building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing	Ongoing	Continue to restrict mobile home location in flood hazard areas (require on foundation & elevated above floodplain)
MH	Ongoing	Ongoing	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing	Ongoing	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	Deferred	Lack Funding	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	Completed	In place	Install surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing	Ongoing	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Completed	Completed	Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Completed		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
MH	Ongoing	Ongoing	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.

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**Table 7.3-12. City of Dayton Mitigation Actions Considered**

Hazard	Status	Comment	Description
Flood			
Flood	Ongoing		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Ongoing		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Deleted	We have no repetitive loss properties	Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Deleted	No repetitive loss properties	Develop and implement mitigation actions for repetitive loss properties.
Flood	Deleted	Lack Funding, Small stock of residential in the floodplain	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Delete	No critical facilities in the floodplain	Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Deleted	No repetitive locations at this time	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Flood	Deleted	We no longer have a program	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Ongoing	Ongoing	Develop, implement, and enforce floodplain management ordinances.
Flood	Delete	No identified properties	Acquire, relocate, elevate, or otherwise flood-proof identified properties.
Flood	Delete	No critical facilities for this action	Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing	Ongoing	Install new streamflow and rainfall measuring gauges.
Flood	Completed	Past Studies Completed	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing	Ongoing	Inventory culverts in need of modification to increase culvert size to increase its drainage efficiency.
Flood	Deleted	Lack Funding,	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate



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**Table 7.3-12. City of Dayton Mitigation Actions Considered**

Hazard	Status	Comment	Description
		Staff	to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Deleted	Lack Funding, Staff	Construct floodwalls around the perimeter of a "facility" and extending above the highest flood elevation to keep floodwaters away from the facility. Floodwalls can be made from gabion baskets, concrete, large riprap, etc. Floodwalls should be used with caution as they can also act as a catchment preventing drainage away from the facility.
Flood	Completed	Completed for Sewage Lagoon	Install triangular or circular flow deflectors on or immediately upstream from bridge footings to deflect water flow and reduce flow velocities preventing footing scour.
Flood	Deleted	Lack Funding	Change under-bridge utility location to under-river
Flood	Deleted	Lack Funding, Staff	Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events. .
Flood	Deleted	Lack Funding	Construct concrete wing walls at culvert or bridge entrances and outlets to direct water flow into their openings
Flood	Deleted	Lack Funding	Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood	Ongoing	Ongoing	Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Winter Storm			
Winter Storm	Deleted	Lack Funding, Staff	Develop and implement strategies and educational outreach programs for debris management from severe winter storms.
Winter Storm	Ongoing	Ongoing	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm	Ongoing		Coordinate with County debris management plans.
Winter Storm	Ongoing	Ongoing	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Ongoing		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storm	Ongoing	Ongoing	Continue tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm	Ongoing	Ongoing	Maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages in new development from severe winter storms. Consider developing incentive programs.
Winter Storm	Completed	In place	Develop personal use and educational outreach training for a safe tree harvesting program. Implement along utility and road corridors, preventing potential winter storm damage.
Winter Storm	Ongoing	Ongoing	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and

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**Table 7.3-12. City of Dayton Mitigation Actions Considered**

Hazard	Status	Comment	Description
			Volunteer Fire Department to coordinate tests.
Winter Storm	Ongoing	Ongoing	Implement and enforce the most current Uniform State Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Ongoing	Ongoing	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide			
Landslide	Deleted	No threatened facilities	Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Wildland Fire			
Wildland Fire	Deleted	Lack Funding, Staff	Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Ongoing		Create partnership to educate and mitigate wildland fire risk with the fire department.
Wildland Fire	Ongoing		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	Ongoing	Ongoing	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Earthquake			
Earthquake	Ongoing	Ongoing	Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Ongoing	Ongoing	Maintain a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Deleted	Not sure if this is City activity	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Deferred	Lack Funding	Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Ongoing	In place	Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing	In place	Implement and enforce the Uniform Building Codes.
Earthquake	Ongoing	Ongoing	Inspect and/or certify all new construction.
Earthquake	Deleted	Not sure the City should lead in this effort	Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.

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**Table 7.3-12. City of Dayton Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Earthquake	Ongoing	Ongoing	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Deleted	Lack Funding	Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	Deleted	Lack Funding	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Deleted	Should City lead out in this effort?	Develop outreach program for educating private facilities to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing	Ongoing	Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<b>Volcano</b>			
Volcano	Ongoing	Ongoing	Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Deleted	Lack Funding	Evaluate capability of sewage lagoon to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
Volcano	Deleted	Lack Funding	Evaluate ash impact on storm water drainage system and develop mitigation actions.
<b>Wind</b>			
Wind	Ongoing	Ongoing	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Ongoing	Ongoing	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing	Ongoing	Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
<b>Erosion</b>			
Erosion	Deleted	Lack Funding	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Ongoing	Ongoing	Continue to regulate development in erosion prone areas
Erosion	Ongoing	Ongoing	Continue outreach program to educate the public concerning planting processes and materials

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**Table 7.3-12. City of Dayton Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
			used to stabilize hill slopes or stream banks. This is known as bio-engineering; which uses logs, root wads, or wood debris or other vegetation to reduce scour and erosion. (Partnership with watershed council)
Erosion	Deleted	Lack Funding, Staff	Install bank revetment protection to prevent erosion.
Erosion	Ongoing	Ongoing	Maintain erosion protection by city park at city sewer outfall header
Erosion	Ongoing	Ongoing	Coordinate with county to protect county park boat landing

## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** [The mitigation strategy section shall include] an action plan describing how the actions identified in **section (c)(3)(ii)** will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- Does the new or updated mitigation strategy include how the actions are prioritized? (For example, is there a discussion of the process and criteria used?)
- Does the new or updated mitigation strategy address how the actions will be implemented and administered, including the responsible department, existing and potential resources, and the timeframe to complete the action?
- Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?
- Does the updated plan identify the completed, deleted, or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred?

Source: FEMA, July 2008.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of the City of Dayton's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Amity's highest priority mitigation actions.

## MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Dayton reviewed the Yamhill County goals and determined they meet the City's needs and subsequently implemented the goals in Table 7.3-13 for the current planning period.

<b>Table 7.3-13 City of Dayton Mitigation Goals</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the City and other jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of the City of Dayton
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

#### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action

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items is based on the information documented in Section II and the Hazard Annexes.

### ***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

### ***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.



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***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan

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five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin on the particular action.

<b>Proposed Action Item:</b>	<b>Alignment with Plan Goals:</b>
Evaluate and harden public infrastructure crossing bridges or rivers	<i>Preventive</i>
<b>Alignment with Existing Plans/Policies:</b>	
<b>Rationale for Proposed Action Item:</b>	
Water and sewer infrastructure is currently hung on a walking bridge that is not stable over the long term. We need to evaluate whether to continue with that model or look at ways to change that.	
<b>Ideas for Implementation:</b>	
City Engineer can help evaluate and provide options. Add potential changes to Water Master Plan and/or Wastewater Facilities Plan.	
<b>Coordinating Organization:</b>	City
<b>Internal Partners:</b>	<b>External Partners:</b>
Public Works, Council	City Engineer

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Potential Funding Sources:		Estimated cost:	Timeline (Circle One):
State Grants/Loans		TBD	Ongoing Immediate (1-3 years) Long term (4+ years)
Form Submitted by:	Scott Pingel		
Action Item Status:	New		

<b>Proposed Action Item:</b> Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.	<b>Alignment with Plan Goals:</b> <i>Education and outreach</i>
<b>Alignment with Existing Plans/Policies:</b>  	
<b>Rationale for Proposed Action Item:</b> It is important to be prepared and have the necessary resources in place in case it becomes necessary to shelter in place for several days or where travel outside the city is not possible.	
<b>Ideas for Implementation:</b> Develop outreach program (possibly through a consultant) Coordinate program with schools, fire district, DCDA and other community organizations.	
<b>Coordinating Organization:</b>	City or Fire District
<b>Internal Partners:</b> Council and City Staff	<b>External Partners:</b> Fire District; School District; Churches; DCDA
<b>Potential Funding Sources:</b>	<b>Estimated cost:</b>
<b>Timeline (Circle One):</b>	

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State Grants; City resources	Up to \$10,000	Ongoing Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Scott Pingel	
<b>Action Item Status:</b>	New	

<b>Proposed Action Item:</b> Identify and prioritize all "jurisdiction-owned" and "non-jurisdiction owned" critical facilities that have backup power and emergency operations plans.	<b>Alignment with Plan Goals:</b> <i>Partnerships; Emergency Operations</i>
<b>Alignment with Existing Plans/Policies:</b>  	
<b>Rationale for Proposed Action Item:</b> With the number of minors and elderly and people generally to shelter, it is important to coordinate plans with the Dayton School District, Dayton Fire District, churches, and other community groups so that we all understand what resources are available in an event.	
<b>Ideas for Implementation:</b> Meet with leaders of the schools, fire district and other community leaders to begin discussing the critical facilities available in Dayton. Hold community meetings and develop publications to provide information to the public.	
<b>Coordinating Organization:</b>	City or Fire District
<b>Internal Partners:</b> City Council, City Staff	<b>External Partners:</b> Fire District, school district, San Martin Church, Dayton Baptist Church, LDS Church, Assembly of God Church, DCDA
<b>Potential Funding Sources:</b>	<b>Estimated cost:</b>
<b>Timeline (Circle One):</b>	

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State Grants; City General Fund		This is mostly a time issue. Cost would be an issue if we need to purchase additional backup power.	Ongoing Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Scott Pingel		
<b>Action Item Status:</b>	New		

## **7.4 CITY OF DUNDEE**

This addendum contains information about the City of Dundee to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section discusses the City of Dundee's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Dundee is located in northeast Yamhill County along the Willamette River. The city's 2013 population was 3,170. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 8.4 percent of the population is under five years of age, 61.4 percent are between the ages of 18 and 64 years, and 11.5 percent of the population is 65 years or older. Of the City of Dundee's 1,644 residents eligible for the labor force, 1,536 were employed, and the unemployment rate was 4.5 percent. The 2012 median household income was \$69,762 and the median family income was \$78,108. The City's per capita income in 2012 was \$28,979. Two and three-tenths percent of the City of Dundee's families were living below the poverty level in 2012. In that same year, 2.8 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

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### DMA 2000 Requirements: Planning Process

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

#### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Dundee is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill the goal, the City organized a MHMP development Steering Committee dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 7.4-1 contains the City of Dundee's Steering Committee participant list to augment the Yamhill County MHMP planning elements.

Table 7.4-1. City of Dundee Steering Committee	
Name	Agency/Department/Affiliation
Rob Daykin	City Administrator
Al Mustain	Superintendent of Public Works
John Stock	Fire Chief

Table 7.4-2 contains the summary of the City of Dundee's public involvement and planning meeting activities.

Table 7.4-2. City of Dundee Public Involvement Mechanisms	
Mechanism	Description
Newsletter Distribution	Distributed with water utility bill
Public Meeting	Two meetings held spring of 2014

## CAPABILITY ASSESSMENT

Table 7.4-3, 7.4-4, and 7.4-5 contain the City's resources used to support planning activities.

<b>Table 7.4-3. City of Dundee Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Comprehensive Plan	Revised several times (1977), latest revision 2003
	Waste Water Facility Plan	2008; revising, new Wastewater Plant-new treatment facility in 2013
	Water Master Plan	Sept 2003; focuses on upgrading water sources, new studies will be completed shortly, looking at potential new treatment facility for use river water as a source; city has a surface water right at this time,
	Transportation System Plan	2014 working on updated
	Street Maintenance Master Plan	Adopted 2008
	Stormwater Runoff Mitigation Plan-In Process of putting mitigation plan together	State Department of Environmental Quality-minimum daily limits. Stormwater discharge entering the Willamette River basin, including bacteria, temperature, and mercury-implementation plan may lead to changes in the development code
	Stormwater Drainage Facility Plan	Adopted 2006
	Public Works Standard	Applies to all improvements within existing and proposed public ROW and to all improvements requiring approval under the development code.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	EOP adopted 2014
	Title 8.70 Hazardous Materials Releases	EOP in place 2014
	Dundee Municipal Code	A codification of general ordinances; current. Guides City governance, development, and public safety and health; guides coordinated development for efficiency and health and safety of the City.
	Fire Dept Evaluations	Facilities, equipment, and staffing levels reviewed; 2014



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**Table 7.4-3. City of Dundee Legal and Regulatory Resources Available for Hazard Mitigation**

Regulatory Tool	Name	Effect on Hazard Mitigation
	Seismic Study on Public Buildings	Completed by the State of Oregon
	Floodway Regulations	<p>15.04 and 15.12 of Dundee Municipal Code</p> <p>15.04.020 The purpose of this code is to establish uniform performance standards providing reasonable safeguards for health, welfare, comfort and security of the residents of this jurisdiction who are occupants and users of buildings and for the use of modern methods, devices, materials, techniques and practicable maximum energy conservation. [Ord. 339 § 2, 1996]</p> <p>15.12 of Dundee Municipal Code: Guides building, health &amp; safety, and mitigation measures for the City.</p>

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**Table 7.4-4. City of Dundee Administrative and Technical Resources for Hazard Mitigation**

<b>Staff/Personnel Resources</b>	<b>Department/Division Position</b>
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract with City of Newberg Planning Dept; Contract with Wallace Engineering to review land use applications and subdivision plans
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Contract-Building Inspector-City of Newberg
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract - Wallace Engineering and development plans filter through Fire, Public Works and Planning Dept
Floodplain manager	Planning Commission administers Floodway Regulations
Personnel skilled in GIS and/or HAZUS-MH	None
Director of Emergency Services	John Stock-Fire Chief; Police Chief-Brian Casey
Finance (grant writers, purchasing)	No grant writers, part-time employee for payroll-Cheryl Hartman
Public Information Officers	Rob Daykin; or if Fire Related-John Stock

**Table 7.4-5. City of Dundee Financial Resources for Hazard Mitigation**

<b>Financial Resources</b>	<b>Effect on Hazard Mitigation</b>
General funds	Yes
Authority to levy taxes for specific purposes	Yes, with vote of people
Incur debt through general obligation bonds	Yes, with vote of people
Incur debt through special tax and revenue bonds	Yes, can be forced to a vote
Incur debt through private activity bonds	No
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate and protect repetitively flooded structures and infrastructure.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

#### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The City of Dundee's Steering Committee determined the following hazards could potentially threaten the community.

<i>Natural Hazards</i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
Drought	X

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for the City of Dundee to augment the MHMP development process. It includes:

- Identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Dundee actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.

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### DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment

#### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## VULNERABILITY ANALYSIS: SPECIFIC STEPS

### Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.4-6A, 7.4-6B, and 7.4-7. Tables 7.4-8, 7.4-9, and 7.4-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Dundee seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### Population and Building Stock

Population data listed in Table 7.4-6A were obtained from the 2000 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.4-6A, 7.4-6B, and 7.4-7.

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<b>Table 7.4-6A. City of Dundee Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>3</sup></b>	<b>Total Building Count</b>	<b>Total Value of Buildings (\$)<sup>1</sup></b>
2,598	2,965	3,170	1,014	240,673,336

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup>Yamhill county Taxing Districts: <http://www.co.yamhill.or.us/sites/default/files/2013%20Taxing%20Districts.pdf>

<sup>3</sup>Portland State University (PSU) 20014 Oregon Population Report.

<b>Table 7.4-6B. City of Dundee NFIP Insurance Report</b>								
<b>City of</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>2</sup></b>
Dundee	965	0	3	980,000	321.67	3	17,679	0

**Source:** FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>2</sup>Content and building claims.

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(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, their locations have been %shaded+for publication. The data will remain in the report for the County's future mitigation planning efforts)

**Table 7.4-7. City of Dundee Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	City Hall and Administrative Offices	620 SW 5th St.	\$500,000
	Water water plant	23310 Fulquartz landing rd	14,000,000 \$
	City of Dundee Assets		\$1,360,855
Emergency Response	Fire Station	801 N Hwy 99W	\$3,200,000
	Police Department (Newberg)	401 E. 3rd St., Newberg	Unknown
Educational	Children's Music Station (private church school)	1110 N. Highway 99 W	Unknown
	Dundee Elementary School (A-5)	140 SW 5th St.	\$2,430,197.00
	Bonnie Benedict Preschool	502 E. 2nd St., Newberg	Unknown
Community	Dundee Women's Center	1026 Highway 99W	Unknown
	Dundee Pioneer Cemetery	NW Viewmont Drive	Unknown
	United Methodist Church	11th St. & N Highway 99W	\$310,609.00
	Promise Church	1802 Haworth Ave., Newberg	\$135,215.00
	Chehalem Park District 18 parks	1802 Haworth A, Newberg	Unknown
	Crabtree Park	see Coordinates	Unknown
	Dundee/Billick Park	see Coordinates	Unknown
	Dundee Scenic Overlook	see Coordinates	Unknown
	Falcon Crest Park	see Coordinates	Unknown
Highways	State Hwy 99W (2 lanes with center turn lane)-with curbs	1 mile	\$385,000
Railroads	Pacific Willamette Railroad-runs through town	1 mile	Unknown
Utilities	Verizon Switching Facility		Unknown
	9 potable water wells and lift stations		Unknown
Utilities	Reservoir, concrete, 1973 (400,000-gallon capacity)		\$501,000
	Reservoir, steel, 1973 (200,000-gallon capacity)		\$197,000
	Reservoir, steel, 1973 (50,000-gallon capacity)		\$94,000
	Lift station and Wastewater Treatment plant		\$1,300,000
	Fiber Optic Route through town that goes to Asia		1 mile
	Water Wells # 1,2,7 & 8 with lift station/clear well reservoir-		\$300,000
	Water Well #5		\$63,000

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**Table 7.4-7. City of Dundee Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Water Well #9		\$113,000
	Water Well #10		\$63,000
	Verizon		Unknown
	Comcast Cable Television		Unknown
	Regional Landfill - near McMinnville (17 miles from Dundee)		Unknown

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.



## Vulnerability Analysis

The vulnerability analysis development process is discussed in the Yamhill County MHMP, Section 6. The following Hazard Exposure Analysis Overviews, Tables 7.4-8, 7.4-9, and 7.4-10, were developed by the City of Dundee's Steering Committee. The results are also depicted in the figures located in Appendix A.

<b>Table 7.4-8. City of Dundee Potential Hazard Exposure Analysis Overview-Population and Buildings</b>							
			<b>Population Number</b>	<b>Buildings</b>			
<b>Hazard Type</b>	<b>Hazard Area</b>	<b>Methodology</b>		<b>Residential</b>		<b>Non-Residential</b>	
				<b>Number</b>	<b>Value (\$)<sup>1</sup></b>	<b>Number</b>	<b>Value (\$)<sup>1</sup></b>
Flood	Moderate	500-year floodplain	--	26	3,978,000	--	--
	High	100-year floodplain	--	26	3,978,000	--	--
Winter Storm		descriptive	3,040	1,014	240,673,336	9	unknown
Landslide	Moderate	14-32 degrees	--	532	81,396,000	5	unknown
	High	>32 degrees	--	152	23,256,000	0	--
Wildland Fire	Moderate	Moderate fuel rank	--	975	149,175,000	9	unknown
	High	High fuel rank	--	921	140,913,000	9	unknown
	Very High	Very high fuel rank	--	283	43,299,000	1	unknown
	Extreme	Extreme fuel rank	--	1	153,000	0	--
Earthquake	Strong	9-20% (g)	--	1,014	195,480,082	9	unknown
	Very strong	>20-40% (g)	--	0	--	0	--
	Severe	>40-60% (g)	--	0	--	0	--
Volcano		descriptive	3,040	1,014	240,673,336	9	unknown
Wind		descriptive	3,040	1,014	240,673,336	9	unknown
Erosion			--	--	--	--	--

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$153,000 per structure). Note-population by parcel was not available at the time this document was prepared. 0.25 mile-buffered EHS sites were not able to be calculated due to the use of census block level data. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed.

Table 7.4-9. City of Dundee Potential Hazard Exposure Analysis Overview-Critical Facilities												
			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$)¹	No.	Value (\$)¹	No.	Value (\$)¹	No.	Value (\$)¹	No.	Value (\$)¹
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	1	400K	--	--	1	unknown	--	--	--	--
Winter Storm		descriptive	2	2.3M	2	1.2M	3	2.4M	--	--	9	446K
Landslide	Moderate	14-32 degrees	2	2.3M	--	--	1	unknown	--	--	6	135K
	High	>32 degrees	1	400K	--	--	1	unknown	--	--	1	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	2	2.3M	2	1.2M	2	unknown	--	--	9	446K
	Very High	Very high fuel rank	1	400K	--	--	1	2.4M	--	--	3	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	2	2.3M	2	1.2M	3	2.4M	--	--	9	446K
Wind		descriptive	2	2.3M	2	1.2M	3	2.4M	--	--	9	446K
Erosion		300øbuffer	--	--	--	--	--	--	--	--	--	--

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Table 7.4-10. City of Dundee Potential Hazard Exposure Analysis Overview-Critical Infrastructure														
			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	1	unknown	--	--
Winter Storm		descriptive	1	385K	1	unknown	--	--	--	--	14	2.6M	--	--
Landslide	Moderate	14-32 degrees	--	--	--	--	--	--	--	--	5	997K	--	--
	High	>32 degrees	--	--	--	--	--	--	--	--	1	300K	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	--	--	--	--	--	--	--	--	8	1.1M	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	1	300K	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	1	300K	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	1	385K	1	unknown	--	--	--	--	14	2.6M	--	--
Wind		descriptive	1	385K	1	unknown	--	--	--	--	14	2.6M	--	--
Erosion		300øbuffer	--	--	--	--	--	--	--	--	1	250K	--	--

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## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards in the 2014 Yamhill County MHMP.

The hazard vulnerability and impact summary is derived from the best available data for facility locations and values. In many cases, values were unavailable; therefore, the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA Flood Insurance Rate Maps (FIRMs) were used to outline the 100-year and 500-year floodplains for the City of Dundee. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

In the City of Dundee, 26 residential structures (value \$3.97M), one government facility (value \$400K), one educational facility (value unknown), and one utility (value unknown) are located within the boundaries of the 100-year floodplain.

There are 26 residential structures (value \$3.97M) with no critical facilities within the 500-year floodplain.

### ***Winter Storm***

Ice, cold, high winds, and floods from winter storms have widespread impacts. Damage to facilities and infrastructure can be severe, depending on the intensity of the storm event.

Since winter storms are regional events, the entire City of Dundee can be affected. Therefore all 3,040 residents, 1,014 residential structures (value \$240.7M), nine non-residential facilities (value unknown), two government facilities (value \$2.3M), two emergency response facilities (value \$1.2M), three educational facilities (value \$2.4M), nine community facilities (446K), one highway and rail segment (value \$385K), and 14 utilities (value \$2.6M) are at risk.

### ***Landslide***

The potential impacts from landslides can be widespread. Debris flows and landslides can impact transportation and rail routes, utility systems, and water and wastewater treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts vary from minor cleanup to more extensive utility system reconstruction. Utility disruptions are usually local and terrain dependent, and sometimes require reestablishing electrical power, communication, and gas pipeline connections at breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and wastewater may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability at the water and wastewater treatment plants.

U.S. Geologic Survey (USGS) elevation datasets were used to determine the landslide hazard areas within the City of Dundee. Risk was assigned based on slope angle. A slope angle less

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than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Using these guidelines, the City of Dundee has 532 residential structures (value \$81.4M), five non-residential structures (value unknown), two government facilities (value \$900K), one educational facility (value unknown), six community facilities (value \$135K), and five utilities (value \$977K) located in areas of moderate risk.

There are 152 residential structures (value \$23.3M), one government facility (value \$400K), one community facility (value unknown), one educational facility (value unknown), and one utility (value \$300K) located within an area of high risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Dundee has critical facilities and infrastructure located within areas with moderate, high, very high, and extreme fuel ranks. Moderate fuel rank areas contain 975 residential structures (value \$149.2M), nine non-residential structures (value unknown), two government facilities (value \$900K), two emergency response facilities (value \$1.2M), three educational facilities (value \$2.4M), nine community facilities (value \$446K), and nine utilities (value \$2.1M).

High fuel rank areas contain 921 residential structures (value \$140.9), nine non-residential structures (value unknown), two government facilities (value \$900K), two emergency response facilities (value \$1.2M), two educational facilities (value unknown), nine community facilities (value \$446K), and eight utilities (value \$1.1M).

Very high fuel rank areas contain 283 residential structures (value \$43.3M), one non-residential structure (value unknown), one government facility (value \$400K), one educational facility (value \$2.4M), three community facilities (value unknown), and one utility (value \$300K).

Extreme fuel rank areas contain one residential structures (value \$153K) and one utility (value \$300K).

### ***Earthquake***

Based on Peak Ground Acceleration (PGA) shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion because of its proximity to the Cascadia Subduction Zone. Ground movement in both areas is likely to cause damage to weak, unreinforced masonry buildings, and to induce landslides along unstable slopes. Earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Dundee is in the eastern portion of Yamhill County in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak

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acceleration of the ground caused by the earthquake, and for a strong designation corresponds to nine to twenty percent of the acceleration of gravity.

Since earthquakes are regional events, the entire City of Dundee can be affected. Therefore all 3,040 residents, 1,014 residential structures (value \$240.7M), nine non-residential facilities (value unknown), two government facilities (value \$2.3M), two emergency response facilities (value \$1.2M), three educational facilities (value \$2.4M), nine community facilities (446K), one highway and rail segment (value \$385K), and 14 utilities (value \$2.6M) are at risk.

### ***Volcano***

Ashfall or tephra are the most likely forms of volcanic activity to impact Yamhill County and the City of Dundee. Damage is likely to result from volcanic eruption columns and clouds containing volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, and can distribute acid rain as sulfur dioxide gas mixes with water. Additionally, these particles can create a risk of suffocation. Carbon dioxide is heavier than air and collects in valleys and depressions, threatening humans and animals. Fluorine clings to ash particles and can pose a toxic threat potentially poisoning grazing livestock and contaminating domestic water supplies.

However, due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability. All 3,040 residents, 1,014 residential structures (value \$240.7M), nine non-residential facilities (value unknown), two government facilities (value \$2.3M), two emergency response facilities (value \$1.2M), three educational facilities (value \$2.4M), nine community facilities (446K), one highway and rail segment (value \$385K), and 14 utilities (value \$2.6M) are equally at risk.

### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Dundee are equally at risk of a windstorm event. Therefore all 3,040 residents, 1,014 residential structures (value \$240.7M), nine non-residential facilities (value unknown), two government facilities (value \$2.3M), two emergency response facilities (value \$1.2M), three educational facilities (value \$2.4M), nine community facilities (446K), one highway and rail segment (value \$385K), and 14 utilities (value \$2.6M) are at risk.

### ***Erosion***

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available; however, descriptions of several localized areas were identified by location on a map referencing the river or stream reach described. Critical facilities at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.



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The City of Dundee identified the wastewater outfall (value \$250K) as at risk from erosion impacts.

### MITIGATION STRATEGY

#### IDENTIFYING MITIGATION ACTIONS

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

##### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

###### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

###### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.4-11, or to revise them to more fully meet the city's needs. The committee proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects used to achieve the goals of a mitigation plan. Table 7.4-12 depicts the city's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.4-12 delineate those actions the city will strive to implement within this five year planning cycle.

##### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

###### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

###### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City of Dundee actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

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The City of Dundee's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing RL properties to assure an effective flood mitigation program.

### MITIGATION GOALS AND ACTION ITEMS CONSIDERED

Table 7.4-11. 2014 Yamhill County Mitigation Goals-Considered	
Goal Number	Goal Description
1	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
7	DEVELOPMENT <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

#### DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions

##### Local Planning Updates and Revisions

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

##### Element

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

Source: FEMA, March 2013.

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**Table 7.4-12. City of Dundee Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	Complete	2013 & 2014	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	<i>Ongoing</i>	In-place	Install lightening rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	<i>Ongoing</i>		Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
MH	<i>Ongoing</i>	Duplicated in Municipal Code	Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Consider		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable

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**Table 7.4-12. City of Dundee Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
			process to implement, monitor, and evaluate citywide mitigation actions.
MH	Consider		Identify and pursue funding opportunities to implement mitigation actions.
MH	Consider		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
<b>Flood</b>			
Flood	<b>Ongoing</b>		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	<b>Ongoing</b>		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	<b>Ongoing</b>		Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	<b>Ongoing</b>		Request DOGAMI debris flow and lahar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.
Flood	Consider		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	<b>Ongoing</b>	In place	Develop, implement, and enforce floodplain management ordinances.
Flood	<b>Ongoing</b>	In place	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Consider		Construct earthen berms to divert flood flows into bridge or culvert openings. The earth fill should be erosion-resistant and the berms should be covered with erosion-resistant fabric, armoring materials, or vegetation.
Flood	<b>Ongoing</b>	In place	Increase culvert size to increase its drainage efficiency.
Flood	<b>Ongoing</b>	In place	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
Flood	<b>Ongoing</b>	In place	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
Flood	<b>Ongoing</b>		Construct debris deflectors to deflect the major portion of debris away from culvert entrances and bridge piers. They are normally "V" shaped.
Flood	<b>Ongoing</b>		Install debris fins upstream of a culvert to align debris so that the debris will pass through a drainage opening without clogging the inlet. They are sometimes used on bridge piers to deflect drifting materials.
Flood	<b>Ongoing</b>	In place	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	<b>Ongoing</b>	In place	Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
<b>Winter Storm</b>			
Winter Storm	<b>Ongoing</b>	In place	Develop and implement strategies and educational outreach programs for debris management from severe winter storms.
Winter	<b>Ongoing</b>		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public

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**Table 7.4-12. City of Dundee Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Storm			infrastructure from severe winter storms.
Winter Storm	Consider		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Consider		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storm	<b>Ongoing</b>	Utility has preventative ops	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm	<b>Ongoing</b>		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storm	<b>Ongoing</b>	In place	Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storm	<b>Ongoing</b>	In place	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Consider		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
<b>Landslide</b>			
Landslide	<b>Ongoing</b>		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Consider		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	Consider		Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	<b>Ongoing</b>		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	Consider		Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Consider		Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.
Landslide	<b>Ongoing</b>	In place	Identify and seasonally restrict recreational and construction activities in high landslide areas.
Landslide	<b>Ongoing</b>	In place	Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
<b>Wildland Fire</b>			
Wildland Fire	<b>Ongoing</b>		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
(Wildland	Consider		Develop emergency operations plan to identify evacuation routes away from high hazard areas and develop

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**Table 7.4-12. City of Dundee Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Fire			outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	Consider		Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	<b>Ongoing</b>		Provide real-time internet access and interagency cooperation to decrease wildland fire warning times.
Wildland Fire	Ongoing		Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	<b>complete</b>	In place	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
<b>Earthquake</b>			
Earthquake	<b>Ongoing</b>		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	complete		Develop Emergency Operations Plan to address response during seismic events.
Earthquake	ongoing		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	complete		Replace or retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	complete	In place	Update existing (or adopt the most current) Uniform Building Code
Earthquake	complete	In place	Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	complete	In place	Inspect and/or certify all new construction.
Earthquake	complete	In place	Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.
Earthquake	<b>Ongoing</b>		Develop outreach program to educate population concerning household, business, and public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.
Earthquake	<b>Ongoing</b>		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	<b>Ongoing</b>		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	<b>Ongoing</b>	In place	Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural

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**Table 7.4-12. City of Dundee Mitigation Actions Considered**

Hazard	Status	Comment	Description
Earthquake	<b>Ongoing</b>	In place	projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	<b>Ongoing</b>	In place	Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	complete		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake			Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<b>Volcano</b>			
Volcano	complete		Address in Emergency Ops Plan public emergency notification procedures and address development of an outreach program for ash fall events.
Volcano	complete		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	<b>complete</b>	In place	Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
<b>Wind</b>			
Wind	complete	In place	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	complete	In place	Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
<b>Erosion</b>			
Erosion	ongoing		Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	ongoing		Apply for grants/funds to implement riverbank protection methods.
Erosion	remove	No waterways in city	Develop bioengineering program to restore riverbank to protect from erosion (ie. planting processes and materials used to stabilize hill slopes or stream banks). This is known as bio-engineering; which uses logs, root wads, or wood debris or other vegetation to reduce scour and erosion.
Erosion	<b>Ongoing</b>		Harden culvert entrance bottoms with asphalt, concrete, rock, to reduce erosion or scour.
Erosion	<b>Ongoing</b>		Install embankment protection such as vegetation, riprap, gabion baskets, sheet piling, and walls to reduce or eliminate erosion.
Erosion	<b>Ongoing</b>		Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end

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**Table 7.4-12. City of Dundee Mitigation Actions Considered**

Hazard	Status	Comment	Description
Erosion	remove	No waterways	walls). Construct a rock or concrete structure to dissipate energy or reduce flow velocity to prevent erosion of the streambed and banks.
Erosion	ongoing		Install flared outlets or end sections at culvert entrances and outlets to match the embankment slope to reduce erosion and scour at the entrance and exit points during high flow.
Erosion	remove	No waterways	Install flow diverters a short distance into a water body, tied into the bank, to protect from erosion at their end. Designed to redirect water flow away from embankments.
Erosion	ongoing		Install channel lining using pipe, rock, concrete, or asphalt to reduce scouring embankments and ditch bottom erosion.
Erosion	remove	No waterways	Install bank revetment protection to prevent erosion.



## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

**Comment [AD1]:** Looks great

Members of the City of Dundee's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Dundee's highest priority mitigation actions.

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### MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Dundee Steering Committee reviewed the Yamhill County goals and determined those listed in Table 7.4-13 meet the City's needs. These goals were implemented for the current planning period.

**Table 7.4-13 City of Dundee Mitigation Goals**

Goal Number	Goal Description
1	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
7	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

Comment [AD4]: same

## **7.5 CITY OF LAFAYETTE**

Section 7.5 contains specific information about the City of Lafayette, Oregon to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section describes the City of Lafayette's planning process by listing Steering Committee membership, documenting public outreach efforts, summarizing the review process, and incorporating existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Lafayette in central Yamhill County, along the north bank the South Yamhill River. The city's 2013 population was 3,755. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 10.4 percent of the population is under five years of age, 57.6 percent are between the ages of 18 and 64, and 7.7 percent of the population is 65 years or older. Of the City of Lafayette's 1,752 residents eligible for the labor force, 1,548 were employed, and the unemployment rate was 8.1 percent. The 2012 median household income was \$56,921 and the median family income was \$54,938. The City's per capita income in 2012 was \$18,033. Eleven percent of the City of Lafayette's families were living below the poverty level in 2012. In that same year, 13.5 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

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**DMA 2000 Requirements: Planning Process**

**Element**

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

**Incorporation of Existing Plans**

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

**Element**

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Lafayette is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill the goal, the City organized a Hazard Mitigation Plan (HMP) development Steering Committee dedicated to identifying hazard threats and developing actions to mitigate damage and life losses from those threats.

Table 7.5-1 contains the City's Steering Committee participant list to augment the Yamhill County MHMP planning elements.

<b>Table 7.5-1. City of Lafayette Steering Committee</b>	
<b>Name</b>	<b>Agency/Department/Affiliation</b>
Preston Polasek (Planning team leader)	City Administrator
Jim Anderson	Public Works Foreman
Chris Heisler	Mayor
Terry Lucich	Fire Chief
Lori Martino	Community Development Clerk

Table 7.5-2 contains the summary of the City's public involvement and planning meeting activities.

<b>Table 7.5-2. City of Lafayette Public Involvement Mechanisms</b>	
<b>Mechanism</b>	<b>Description</b>
Newsletter	Mailed newsletter to introduce the project and request public input
County Website/Facebook	Yamhill County Emergency Management Survey

## CAPABILITY ASSESSMENT

Table 7.5-3, 7.5-4, and 7.5-5 contain the City's resources used to support planning activities, including the reports and studies reviewed during the update of this MHMP.

<b>Table 7.5-3. City of Lafayette Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Lafayette Comprehensive Plan	The comprehensive plan for Lafayette reflects the need to plan for future growth in order to assure adequate lands for various land use requirements, adequate levels of public service and that hazard areas and significant resources are protected. The plan also conforms with the requirements of the statewide planning program. The City anticipates application of the Plan goals and policies will enable the City to prioritize economic needs, investigate funding sources, and direct growth in a cost-efficient manner.
	Lafayette Water Master Plan	Defines water usage for the City and potential mitigation options.
	Lafayette Structural Report	Defines structure requirements to ensure personal health and safety.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	Provides for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency. Describes known hazards.
	Title 8.70 Hazardous Materials Releases	Provides procedure for coordination among various agencies in the event of hazardous materials releases. Describes known hazards.
	Municipal Code	Guides land-use development and transportation requirements. This code consists of all the regulatory and penal ordinances and certain administrative ordinances of the City of Lafayette, Oregon.
	Lafayette Zone Development Ordinance	This Ordinance is enacted to: <ul style="list-style-type: none"> <li>• Implement the goals and policies of the City of Lafayette Comprehensive Land Use Plan</li> <li>• Provide methods of administering and enforcing the provisions of this Ordinance</li> <li>• Promote the public health, safety, and general welfare of the community</li> </ul>
	Lafayette Sign Code	The purpose of this Code is to provide equitable rights, reduce conflicts, promote traffic and pedestrian safety, increase the aesthetic value and economic viability of the city, all by classifying and regulating the location, size, type and number of signs and related matters, in a content-neutral manner.
Policies (Municipal Codes)	Address & Zoning Map	Delineates building zones for development and construction regulation.
	Yamhill Water Supply Analysis Report (4/07)	Identifies issues concerning health and safety and provides guidance for mitigating unfavorable water condition.

**Table 7.5-4. City of Lafayette Administrative and Technical Resources for Hazard Mitigation**

<b>Staff/Personnel Resources</b>	<b>Department/Division Position</b>
Planner(s) or engineer(s) with knowledge of land development and land management practices	Lori Martino, Community Development Clerk Contract Planner-Mid-Willamette Valley COG
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Contract-Brooks Bateman, Building Official
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Contract-Chuck Eaton
Floodplain Manager	Lori Martino, Community Development Clerk
Director of Emergency Services	Preston Polasek
Finance (grant writers, purchasing)	Preston Polasek
Public Information Officers	Preston Polasek

**Table 7.5-5. City of Lafayette Financial Resources for Hazard Mitigation**

<b>Financial Resources</b>	<b>Effect on Hazard Mitigation</b>
General funds	Yes-Contingency Funds
Authority to levy taxes for specific purposes	Yes - Only with voter approval
Incur debt through general obligation bonds	Yes- Only with voter approval
Incur debt through special tax and revenue bonds	Yes-City has authority for revenue bonds with limits
Incur debt through private activity bonds	Can incur up to the state limit of debt (cap), based on Charter cannot enter into contract for over 1 million dollars without a vote.
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United States Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

■ DMA 2000 Requirements: Risk Assessment: Identifying Hazards	
■ Identifying Hazards	
■ Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.	
■ Element	
■ B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?	
■ B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?	
■ Source: FEMA, March 2013.	

The City of Lafayette's Steering Committee determined the following hazards could potentially threaten the community. Those hazards identified with an (x) were identified as occurring in the City of Lafayette.

Natural Hazards	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano*	X
Wind	X
Erosion	
Drought	X

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for the City of Lafayette to augment the MHMP development process. It comprises:

- Identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Lafayette actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.



**DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment**

■

**Assessing Vulnerability: Multi-Jurisdictional Risk Assessment**

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

**Element**

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## **VULNERABILITY ANALYSIS**

### **Asset Inventory**

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.5-6A, 7.5-6B, and 7.5-7. Tables 7.5-8, 7.5-9, and 7.5-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Lafayette seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### **Population and Building Stock**

Population data listed in Table 7.5-6A were obtained from the 2000 U.S. Census and Portland State University. It contains census block level data and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.5-6A, 7.5-6B, and 7.5-7.

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<b>Table 7.5-6A. City of Lafayette Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>3</sup></b>	<b>Total Building Count<sup>2</sup></b>	<b>Total Value of Buildings (\$)</b>
2,586	3,105	3,755	1200	170,161,625

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Yamhill county Taxing Districts: <http://www.co.yamhill.or.us/sites/default/files/2013%20Taxing%20Districts.pdf>

<sup>2</sup> City of Lafayette Utility Building Records

<sup>3</sup> Portland State University (PSU) 2014 Oregon Population Report.

<b>Table 7.5-6B. City of Lafayette NFIP Insurance Report</b>								
<b>City of</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>1</sup></b>
Lafayette	294	0	1	210,000	294.00	0	0	0

**Source:** FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>1</sup>Content and building claims.

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(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, their locations have been %shaded+for publication. The data will remain in the report for the County's future mitigation planning efforts)

**Table 7.5-7. City of Lafayette Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government and Emergency Response	Lafayette City Hall/ Fire Station/ Court	486 3rd St.	\$1,800,000
	Public Works Shops	260 S. Madison St.	\$300,000
Educational	Little Learners Preschool	344 3rd St.	\$750,000
	Wascher Elementary School	986 7th St Ext.	\$12,000,000
Community	Joel Perkins Park	451 E. 8 <sup>th</sup> St.	\$100,000
	Commons Park	133 Adams St	\$80,000
	Terry Park	S. Madison St.	\$30,000
	Highlands Park	1015 E. 15 <sup>th</sup> St.	\$70,000
	Lafayette Community Church	365 3rd St.	\$700,000
	Bible Baptist Church of Lafayette	514 Market St.	\$400,000
	Lafayette Community Center	133 Adams St.	\$100,000
	Yamhill County Historical Museum	605 and 657 Market St.	\$350,000
State and Federal Highways	State Highway 99W	Through town-east to west	1.5 miles; 2 lanes blacktop with curbs
Railroads	Willamette & Pacific Railroad	Through town-east to west	1.5 miles
Bridges	None in City Limits- Access to town provided by Yamhill County Bridge on Lafayette Hwy		\$4,146,000
Transportation Facilities	Lafayette Airstrip		N/A
	Well #4		\$500,000
Utilities	Water Treatment Plant including 4 wells and 3 springs		\$2,000,000
	Wastewater Treatment Plant		\$7,000,000
	4 Lift Stations		\$2,000,000
	City Park Well		\$500,000
	Water Tank (500,000 gal)		\$1,000,000
	Water Distribution System		\$6,600,000
	Sewage Collection System		\$8,700,000

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

## Vulnerability Analysis

The vulnerability analysis development process is discussed in the Yamhill County MHMP Section 6. The following Hazard Exposure Analysis Overviews, Tables 7.5-8, 7.5-9, and 7.5-10, were developed by the City of Lafayette Steering Committee. The results are also depicted in the figures located in Appendix A.

**Table 7.5-8. City of Lafayette Potential Hazard Exposure Analysis Overview-Population and Buildings**

			Population Number	Buildings			
Hazard Type		Hazard Area		Residential		Non-Residential	
		Methodology		Number	Value (\$) <sup>1</sup>	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	-- <sup>2</sup>	--	--	--
	High	100-year floodplain	--	-- <sup>2</sup>	--	--	--
Winter Storm		Descriptive	3,755	1,200	170.2M	50	unknown
Landslide	Moderate	14-32 degrees	--	-- <sup>2</sup>	--	--	--
	High	>32 degrees	--	-- <sup>2</sup>	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	-- <sup>2</sup>	--	1	300K
	High	High fuel rank	--	-- <sup>2</sup>	--	--	--
	Very High	Very high fuel rank	--	-- <sup>2</sup>	--	--	--
	Extreme	Extreme fuel rank	--	-- <sup>2</sup>	--	--	--
Earthquake	Strong	9-20% (g)	3,755	1,200	170.2M	50	unknown
	Very strong	>20-40% (g)	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--
Volcano		Descriptive	3,755	1,200	170.2M	50	unknown
Wind		Descriptive	3,755	1,200	170.2M	50	unknown
Drought		Descriptive		--	--	--	--

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$125,400 per structure). Note-population by parcel was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed. 0.25-mile buffered EHS sites were calculated due to the use of census block level data.

<sup>2</sup> The City of Lafayette Steering Committee elected to not use the census block-level data for analysis of residential structures in flood, landslide, and wildland fire hazard areas.

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**Table 7.5-9. City of Lafayette Potential Hazard Exposure Analysis Overview-Critical Facilities**

			Government / Emergency Response		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	--	--
Winter Storm		descriptive	2	2.1M	--	--	2	12.8M	--	--	8	1.8M
Landslide	Moderate	14-32 degrees	--	--	--	--	--	--	--	--	--	--
	High	>32 degrees	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	--	--
	High	High fuel rank	--	--	--	--	--	--	--	--	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	2	2.1M	--	--	2	12.8M	--	--	8	1.8M
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	2	2.1M	--	--	2	12.8M	--	--	8	1.8M
Wind		descriptive	2	2.1M	--	--	2	12.8M	--	--	8	1.8M
Drought		Descriptive	--	--	--	--	--	--	--	--	--	--

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**Table 7.5-10. City of Lafayette Potential Hazard Exposure Analysis Overview-Critical Infrastructure**

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	1	800K	--	--
	High	100-year floodplain	--	--	--	--	--	--	--	--	--	--	--	--
Winter Storm		descriptive	1.5	unknown	1.5	unknown	1	4.1M	1	unknown	8	28.3M	--	--
Landslide	Moderate	14-32 degrees	--	--	--	--	--	--	--	--	--	--	--	--
	High	>32 degrees	--	--	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	--	--	--	--	1	2M	--	--
	High	High fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1.5	unknown	1.5	unknown	1	4.1M	1	unknown	8	28.3M	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	1.5	unknown	1.5	unknown	1	4.1M	1	unknown	8	28.3M	--	--
Wind		descriptive	1.5	unknown	1.5	unknown	1	4.1M	1	unknown	8	28.3M	--	--
Drought		Descriptive	--	--	--	--	--	--	--	--	--	--	--	--

<sup>1</sup> 6 estimated insured values

## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards identified in the 2014 Yamhill County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Lafayette. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

There is one utility (worth \$800K) located in the 500-year floodplain and therefore accorded a moderate risk.

The City of Lafayette Steering Committee elected to not use the census block-level data for analysis of residential and non-residential structures in flood hazard areas.

### ***Winter Storm***

Winter storms have widespread impacts that are most often the result of the ice, cold, high winds and flooding they bring. Damage to facilities and infrastructure can be severe, depending on the intensity of the storm event.

Since winter storms are regional events, the entire City of Lafayette is equally vulnerable. Therefore, 3,755 residents, 1200 residential structures (worth \$170.2M), 50 non-residential structures (value unknown), two government/emergency response facilities (value \$2.1M), two educational facilities (value \$13M), eight community facilities (value \$1.8M), 1.5 miles of highway and rail (value unknown), one bridge (value \$4.1M), one transportation facility (value unknown), and eight utilities (value \$28.3M) are at risk.

### ***Landslide***

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and wastewater utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Lafayette. Risk was assigned based on slope angle. A slope angle less than 14 degrees was

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assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Using these guidelines, the City of Lafayette has landslide prone areas located along stream banks.

The City of Lafayette Steering Committee elected to not use the census block-level data for analysis of residential and non-residential structures in landslide hazard areas. In addition, GIS analysis results were not used by the Steering Committee to determine critical facilities and infrastructure in hazard areas.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Lafayette has critical infrastructure located within an area with moderate fuel ranks. The moderate fuel rank area contains one non-residential structures (worth \$300K) and one utility (worth \$2M).

The City of Lafayette Steering Committee elected to not use the census block-level data for analysis of residential structures in the wildland fire hazard area. In addition, GIS analysis results were not used by the Steering Committee to determine critical facilities and infrastructure in hazard areas.

### ***Earthquake***

Based on PGA shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. In addition, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Lafayette is in the eastern portion of Yamhill County in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake, and for a strong designation corresponds to nine to 20 percent of the acceleration of gravity.

The entire City of Lafayette can be equally affected by earthquakes. Therefore, 3,755 residents, 1200 residential structures (worth \$170.2M), 50 non-residential structures (value unknown), two government/emergency response facilities (value \$2.1M), two educational facilities (value \$13M), eight community facilities (value \$1.8M), 1.5 miles of highway and rail (value unknown), one bridge (value \$4.1M), one transportation facility (value unknown), and eight utilities (value \$28.3M) are at risk.



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### ***Volcano***

Ashfall or tephra from volcanic activity is most likely to impact Yamhill County and the City of Lafayette. Damage is likely to result from volcanic eruption columns and clouds containing volcanic gases, minerals, and rock. The ash columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, and can distribute acid rain as sulfur dioxide gas mixes with water. Because carbon dioxide is heavier than air and collects in valleys and depressions, these ash particles can create a risk of suffocation as threatening human and animals. Fluorine can cling to ash particles, and pose a toxic threat potentially poisoning grazing livestock and contaminating domestic water supplies.

Due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability. The entire City of Lafayette can be equally affected by volcano ashfall. Therefore, 3,755 residents, 1200 residential structures (worth \$170.2M), 50 non-residential structures (value unknown), two government/emergency response facilities (value \$2.1M), two educational facilities (value \$13M), eight community facilities (value \$1.8M), 1.5 miles of highway and rail (value unknown), one bridge (value \$4.1M), one transportation facility (value unknown), and eight utilities (value \$28.3M) are at risk.

### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Lafayette are equally at risk of a windstorm event. Therefore, 3,755 residents, 1200 residential structures (worth \$170.2M), 50 non-residential structures (value unknown), two government/emergency response facilities (value \$2.1M), two educational facilities (value \$13M), eight community facilities (value \$1.8M), 1.5 miles of highway and rail (value unknown), one bridge (value \$4.1M), one transportation facility (value unknown), and eight utilities (value \$28.3M) are at risk.

### ***Drought***

State-wide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the City of Newberg's local economy such as agriculture, fishing, and timber have historically been affected, and any future droughts would have tangible economic and potentially human impacts. Groundwater shortages due to droughts would impact access to drinking water.

## **MITIGATION STRATEGY**

### **IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

#### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

##### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.2-11, or to revise them to more fully meet the city's needs. The committee proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects used to achieve the goals of a mitigation plan. Table 7.2-12 depicts the city's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.2-12 delineate those actions the city will strive to implement within this five year planning cycle.

#### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

##### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

##### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City of Lafayette actively participates in FEMA's National Flood Insurance Program (NFIP) and have implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties. They subsequently selected and prioritized City appropriate actions to assure an effective flood mitigation program.

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**MITIGATION GOALS AND ACTION ITEMS CONSIDERED**

<b>Table 7.5-11. 2014 Yamhill County Mitigation Goals-Considered</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

**DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions**

**Local Planning Updates and Revisions**

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

**Element**

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

**Source:** FEMA, March 2013.

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**Table 7.5-12. City of Lafayette Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	<i>Ongoing</i>		Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	<i>Ongoing</i>		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Delete	Not our lines No funds	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.
MH	<i>Ongoing</i>		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	Consider	ongoing	Install lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Consider	Build new	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Consider		Identify and pursue funding opportunities to implement mitigation actions.
<b>Flood</b>			
Flood	Consider		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	<i>Ongoing</i>		Develop, implement, and enforce floodplain management ordinances.
Flood	<i>Ongoing</i>		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	<i>Ongoing</i>		Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
<b>Winter Storm</b>			
Winter Storm	<i>Ongoing</i>		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm	<i>Ongoing</i>		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Consider		Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Delete	Not our lines no funds	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line severe wind or winter ice storm event failure.
Winter Storm	<i>Ongoing</i>		Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.

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**Table 7.5-12. City of Lafayette Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Landslide</b>			
Landslide	Ongoing		Develop, implement and enforce development restrictions in High Hazard Areas
<b>Wildland Fire</b>			
Wildland Fire	Ongoing		Implement program to maintain fire trails throughout watershed area for access.
Wildland Fire	Ongoing		Reduce underbrush fuel in watershed critical areas.
Wildland Fire	Ongoing		Train and equip fire personnel in wildland fires and familiarize them with the water shed area.
<b>Earthquake (EQ)</b>			
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, and wastewater systems within the jurisdiction.
Earthquake	Ongoing	Build new	Retrofit or rebuild important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
<b>Volcano</b>			
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
<b>Wind</b>			
Wind	Consider		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Delete	Not our lines no funds	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
<b>Technological and Manmade Hazards</b>			
<b>Disruption of Utility and Transportation Systems (DUTS)</b>			
DUTS	Ongoing		Develop outreach program to educate and encourage residents to maintain several days of emergency supplies for power outages or road closures.
DUTS	Ongoing		Review and update emergency response plans for utility disruptions.
DUTS	Ongoing		Identify and prioritize all jurisdiction owned & non-jurisdiction owned critical facilities that have backup power and emergency operations plans.
DUTS	Ongoing		Purchase backup power systems for all identified critical facilities.
<b>Hazardous Materials (HAZMAT)</b>			
HAZMAT	Consider		Enhance emergency planning, emergency response training, and equipment acquisition to address hazardous materials incidents for emergency and first responders and public works staff.
HAZMAT	Consider		Train Public Works staff to identify extremely hazardous substances (EHS) and to follow EMS protocols.

## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

- **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

- **Implementation of Mitigation Actions**

- **Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

- **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

- Source: FEMA, March 2013.

The Steering Committee evaluated and prioritized each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. During these meetings, the Committee determined the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

To complete this task, Steering Committees reviewed the Benefit-Cost Analysis Information (Appendix F) and prioritized their list by assessing the risks based on actual past damage and focused on items the City of Lafayette can realistically accomplish.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the City of Lafayette and the responsible entities to implement during the five year lifespan of this version of the MHMP. The following Action Item Worksheets depict the City of Lafayette's mitigation actions grouped by hazard and in descending priority order within each hazard.

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### MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Lafayette reviewed the Yamhill County goals and modified them to better suit the City's needs and subsequently adopted the Goals in Table 7.5-13 for the current planning period.

Table 7.5-13 City of Lafayette Mitigation Goals	
Goal Number	Goal Description
1	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the City, County and other local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in the City of Lafayette.
7	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

### IMPLEMENTING A MITIGATION ACTION PLAN

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

<p style="text-align: center;"><b>DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions</b></p> <p><b>Identification of Multi-Jurisdictional Mitigation Actions</b></p> <p><b>Requirement §201.6(c)(3)(iv):</b> For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.</p>
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### Element

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

### ACTION ITEM WORKSHEETS

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

#### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

#### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

#### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

#### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section II and the Hazard Annexes.

#### ***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan



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maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

### ***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

### ***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### ***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance

## **Jurisdictional Addenda City of Lafayette**

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Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

### ***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

### ***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

### ***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan's five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin on the particular action.

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Purchase electronic reader board for the hwy. through Lafayette next to City Hall		Yes	
<b>Alignment with Existing Plans/Policies:</b>			
<b>Rationale for Proposed Action Item:</b>			
To communicate with citizens important notices when cell phone and internet fail. Pass along warning notice for critical information to lots of people quickly on the state highway next to city hall.			
<b>Ideas for Implementation:</b>			
Funds put in the budget for future purchase. Procedures and policies being looked at for use.			
<b>Coordinating Organization:</b>			
<b>Internal Partners:</b>		<b>External Partners:</b>	
City of Lafayette		Yamhill county, PGE, northwest natural, osp, odot	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
In the budget under general funds		\$10,000	Ongoing <u>Immediate (1-3 years)</u> Long term (4+ years)
<b>Form Submitted by:</b>	Preston Polasek		
<b>Action Item Status:</b>	ongoing		

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City of Lafayette**

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Develop Reverse 911 system		<i>Communications</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Yes			
<b>Rationale for Proposed Action Item:</b>			
Continue to lobby for the purchase of a reverse 911 system for citizens of Lafayette and surrounding areas			
<b>Ideas for Implementation:</b>			
<ol style="list-style-type: none"> <li>1. Can be tailored to specific areas or all areas for any type of emergency</li> <li>2. Quick, efficient and direct</li> <li>3. Could give instructions</li> </ol>			
<b>Coordinating Organization:</b>			
<b>Internal Partners:</b>		<b>External Partners:</b>	
Sheriffs Office, fire, city		Amity, Carlton, Dayton, McMinnville, Yamhill, Yamhill County, State, Feds	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
External partners		\$20,000	Ongoing <u>Immediate (1-3 years)</u> Long term (4+ years)
<b>Form Submitted by:</b>	Preston Polasek		
<b>Action Item Status:</b>	Ongoing		

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Purchase an all-terrain vehicle for transportation		Yes	
<b>Alignment with Existing Plans/Policies:</b>			
Yes			
<b>Rationale for Proposed Action Item:</b>			
For access to all critical infrastructures during all types of events. Provide emergency services to all areas of the city (Water Shed/Pump stations) Transport staff to critical facilities and services during the event Check on at risk citizens			
<b>Ideas for Implementation:</b>			
Funds have been provided in the budget. This is something that will happen in the near future. Policies & Procedures are in the process of being created.			
<b>Coordinating Organization:</b>		City of Lafayette	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City of Lafayette		None	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General Fund in budget		\$9,000	Ongoing Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Terry Lucich		
<b>Action Item Status:</b>	Ongoing		

## **7.6 CITY OF NEWBERG**

This addendum contains specific City of Newberg information to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section discusses the City of Newberg's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Newberg is located in the northeast corner of Yamhill County, Oregon, on the north side of the Willamette River. The city's 2013 population was 22,580. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 7.2 percent of the population is under five years of age, 65.5 percent are between the ages of 18 and 64, and 11.1 percent of the population is 65 years or older. Of the City of Newberg's 11,823 residents eligible for the labor force, 10,990 were employed, and the unemployment rate was 4.8 percent. The 2012 median household income was \$54,722 and the median family income was \$66,563. The City of Newberg's per capita income in 2012 was \$22,754. Nine and six-tenths percent of families were living below the poverty level in 2012. In that same year, 14.4 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

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### DMA 2000 Requirements: Planning Process

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

#### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Newberg is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill that goal, the City organized a Hazard Mitigation Plan development Steering Committee dedicated to identifying hazard threats and developing actions that can be taken to mitigate damage and life losses from those threats.

Table 7.6-1 contains the City's Steering Committee participant list to augment the Yamhill County MHMP planning elements.

Table 7.6-1. City of Newberg Steering Committee	
Name	Agency/Department/Affiliation
Brittney Jeffries	Department Support Coordinator
Jay Harris	Public Works Director, Pro-Tem
Mary Newell	Communications Support Services
Steve Olson	Building and Planning Director, Pro-Tem

Table 7.6-2 contains the summary of the City's public involvement and planning meeting activities.

Table 7.6-2. City of Newberg Public Involvement Mechanisms	
Mechanism	Description
City Website/Facebook	Yamhill County Emergency Management Survey
City Safety Fair	Yamhill County Emergency Management Booth

## CAPABILITY ASSESSMENT

Table 7.6-3, 7.6-4, and 7.6-5 contain the City's resources used to support planning activities.

<b>Table 7.6-3. City of Newberg Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Newberg Comprehensive Plan	City of Newberg's existing and future land use plan
	Yamhill County Comprehensive Plan	Defines County governance , responsibilities, land use, zoning and delineates agency areas of responsibilities.
	Newberg Fire Department 2004 Strategic Plan	Strategic plan to assure that the City's Fire Department continues to provide quality EMT and fire protection services at the lowest reasonable cost.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Title 13	Public Utilities and Services
	Title 15	Development Code



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City of Newberg**

**Table 7.6-4. City of Newberg Administrative and Technical Resources for  
Hazard Mitigation**

<b>Staff/Personnel Resources</b>	<b>Department/Division Position</b>
Professional(s) with knowledge of land development and land management practices	Building, Planning and Engineering
Professional(s) trained in construction practices related to buildings and/or infrastructure	Building and Fire Marshall
Professional(s) with an understanding of manmade or natural hazards	Planning, Engineering and Fire Marshall
Floodplain manager	Public Works Director
Personnel skilled in GIS and/or HAZUS-MH	Engineering
Finance (grant writers, purchasing)	Finance Director and Grant writer
Public Information Officers	Administration, Police and Fire

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**Table 7.6-5. City of Newberg Financial Resources for Hazard Mitigation**

<b>Financial Resources</b>	<b>Effect on Hazard Mitigation</b>
General funds	No
Authority to levy taxes for specific purposes	Yes, with voter approval
Incur debt through general obligation bonds	Unknown
Incur debt through special tax and revenue bonds	Unknown
Incur debt through private activity bonds	Unknown
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

#### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The City of Newberg's Steering Committee determined that the following could potentially threaten the community. Those identified with an (x) are specific to the City of Newberg.

<i>Natural Hazards</i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
Drought	X

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for the City of Newberg to augment the MHMP development process. It comprises:

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Newberg actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.

### **DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment**

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### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## VULNERABILITY ANALYSIS

### Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.6-6A, 7.6-6B, and 7.6-7. Tables 7.6-8, 7.6-9, and 7.6-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Newberg seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### Population and Building Stock

Population data listed in Table 7.6-6A were obtained from the 2010 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.6-6A, 7.6-6B, and 7.6-7.

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<b>Table 7.6-6A. City of Newberg Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>3</sup></b>	<b>Total Building Count</b>	<b>Total Value of Buildings (\$)<sup>1</sup></b>
18,064	20,565	22,580	7,736	1,546,167,978

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2010.

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$135,400 per structure).

<sup>2</sup> Yamhill county Taxing Districts: <http://www.co.yamhill.or.us/sites/default/files/2013%20Taxing%20Districts.pdf>

<sup>3</sup> Portland State University (PSU) 2014 Oregon Population Report.

<b>Table 7.6-6B. City of Newberg NFIP Insurance Report</b>								
<b>City of</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>2</sup></b>
Newberg	1,885	0	5	1,160,000	377.0	1	0	1

**Source:** FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>2</sup>Content and building claims.

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(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, their locations have been shaded for publication. The data will remain in the report for the County's future mitigation planning efforts)

**Table 7.6-7. City of Newberg Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	City Hall	414 E. 1st St.	Unknown
	Annex	115 S. Howard St.	Unknown
	Public Safety Building	401 E. Third St.	Unknown
	US Post Office	401 E. First St.	Unknown
Emergency Response	Fire Station #20	414 E. 2nd St.	Unknown
	Fire Station #21	3100 Middlebrook Dr.	Unknown
Educational	Benedict Preschool	504 E. 2nd St.	Unknown
	Jack and Jill Christian Preschool	3231 Antonia Way	Unknown
	George Fox University	414 N. Meridian	Unknown
	Ewing Young Elementary	17600 N. Valley Rd.	Unknown
	School District Shops	703 S. Blaine St.	Unknown
	Administration Office	714 E. 6th St.	Unknown
	Mabel Rush Elementary	1441 N. Deborah Rd.	Unknown
	Edwards Elementary	715 E. 8th St.	Unknown
	Antonia Crater Elementary	203 W. Foothills Dr.	Unknown
	Joan Austin Elementary	2200 N. Center St.	Unknown
	Mountainview Middle School	2015 N. Emery Dr.	Unknown
	Chehalem Valley Middle School	403 W. Foothills Dr.	Unknown
	Newberg High School	2400 Douglas Ave.	Unknown
	Portland Community College	135 Werth BLVD.	Unknown
	C.S. Lewis Academy	609 Wyooski Street	Unknown
	Veritas School	401 Mission Drive	Unknown
ArHealth Care	Providence Newberg Medical Center	310 Villa Rd.	Unknown
	Providence Newberg Medical Center	218 Villa Rd.	Unknown

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**Table 7.6-7. City of Newberg Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Providence Newberg Medical Center	1515 E. Portland Rd.	Unknown
	Providence Newberg Medical Center	1001 Providence Dr.	Unknown
	Chehalem Health & Rehab Center	1900 E. Fulton St.	Unknown
	Senior Center	303 W. Foothills Dr.	Unknown
	Avamere-Newberg	730 Foothills Dr.	Unknown
	Arbor Oaks Terrace	317 Werth BLVD	Unknown
	Friendsview Village	1301 E. Fulton St.	Unknown
	Marquis Care Home	1500 E. First St.	Unknown
Community	Willow Place	1307 N. College St.	Unknown
	Assembly of God	502 S. St. Paul Hwy	Unknown
	Astor House	3801 Hayes St.	Unknown
	Calvary Chapel Church	120 S. Elliott Rd.	Unknown
	Chehalem Airpark	NE Dopp Rd.	Unknown
	Chehalem Springs	3802 Hayes St.	Unknown
	Christ Community Church	611 N Main St.	Unknown
	Church of Christ	2505 Haworth Ave	Unknown
	Church of God	715 S. River St.	Unknown
	Central Community Center	415 E. Sheridan St.	Unknown
	Swimming Pool	1802 Haworth Ave.	Unknown
	Nicholas Park	1806 Haworth Ave.	Unknown
	Community Center	500 E. 2nd St.	Unknown
	Memorial Park	411 S. Blaine St.	Unknown
	College Park	1200 Sierra Vista St.	Unknown
	Gladys Park	3720 Mistletoe Drive	Unknown
	Schaad Park	Eagle Street	Unknown
	Tom Gail Park	1060 E. Edgewood Drive	Unknown
	Spring Meadow Park	3815 Vittoria Way	Unknown
	Oak Knowl Tot Lot	1001 Hilltop Drive	Unknown



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**Table 7.6-7. City of Newberg Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Jaquith Park (East)	1215 N. College St.	Unknown
	Rotary Centennial Park	415 E. Sheridan St.	Unknown
	Ewing Young Park	1207 S. Blaine St.	Unknown
	Armory Community Center	620 Morton St.	Unknown
	Jaquith Park (West)	1414 N. Main St.	Unknown
	CPRD Offices	125 S. Elliott Rd.	Unknown
	Skate Park	1201 S. Blaine St.	Unknown
Community	Chehalem Valley Baptist Church	26155 NE Bell Rd.	Unknown
	Episcopal Church	110 S. Everest Rd.	Unknown
	First Baptist Church	1619 E. 2nd St.	Unknown
	First Baptist Church	24950 North Valley Rd.	Unknown
	FourSquare Gospel	115 W. 3rd St.	Unknown
	Friends Church	200 S. College St.	Unknown
	Friends Church cemetery	500 S. Everest Rd.	Unknown
	Friends Church	600 E. 3rd St.	Unknown
	Friends Church vacant land	605 E. 3rd St.	Unknown
	Friends Church vacant land	607 E. 3rd St.	Unknown
	Friends Church vacant land	215 S. College St.	Unknown
	Godsong Community Church	1025 Industrial Parkway	Unknown
	Hazelden NW	1901 Esther St.	Unknown
	Jehovah's Witness Church	1709 Hoskins St.	Unknown
	Joyful Servant Lutheran	1716 N. Villa Rd.	Unknown
	Mormon Church	1212 Deborah Rd.	Unknown
	Nazarene Church	23177 NE Old Yamhill Rd.	Unknown
	Newberg Christian Church	2315 Villa Rd.	Unknown
	Jaquith Park (East)	1215 N College St.	Unknown
	Buckley Park	201 E. Mountainview Dr.	Unknown
	Hospital Thrift Store	305 S. Howard St.	Unknown
	Scout House	411 S. Howard St.	Unknown

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**Table 7.6-7. City of Newberg Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Hoover Park	114 S. River St.	Unknown
	Scott Levitt Park	1310 E. 10th St.	Unknown
	Rotary Park	503 E. Sheridan St.	Unknown
Community	Library Annex	211 N. Howard St.	Unknown
	Francis Square	625 E. 1st St.	Unknown
	Newberg Gospel Church	4301 N. College St.	Unknown
	Newberg Public Library	503 E. Hancock St.	Unknown
	Northside Community Church	1800 Hoskins St.	Unknown
	NV Friends Church	4020 N. College St.	Unknown
	Open Bible Church	1605 N. College St.	Unknown
	Presbyterian Church	501 Mission Dr.	Unknown
	2nd St. Community Church	504 E. First St.	Unknown
	Seventh Day Adventist	530 Edgewood Dr.	Unknown
	Sportsman Airpark	504 S. Airpark Way	Unknown
	St. Peter Catholic Church	2315 N. Main St.	Unknown
	Trinity Orthodox Presbyterian	600 E. Columbia Dr.	Unknown
	United Methodist Church	1205 Deborah Rd.	Unknown
	Zion Lutheran Church	301 S. River St.	Unknown
	Word of Faith Church	108 S. Howard St.	Unknown
	Highway Maintenance Station	801 N. College St.	Unknown
State and Federal Highways	Hwy 99W		5 miles within the city
	Hwy 219		5 miles within the city
	Hwy 240		0 miles within the city
	Sunnycrest Rd.		0 miles within the city
	Dayton Ave.		.75 miles within the city
	Willamette-Pacific Railroad		5 miles within the city
Railroads	Wynooski/ Willamette River bridge		Unknown
Bridges	Chehalem 99W Bridge		Unknown
	St. Paul Hwy 219 Bridge		Unknown

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**Table 7.6-7. City of Newberg Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Chehalem Hwy 240 Bridge		Unknown
	Chehalem/ Dayton Ave. Bridge		Unknown
	Sunnycrest/ Chehalem Bridge		Unknown
Utilities	Pump Stations		Unknown
	Newberg Water Reservoirs		Unknown
	Sewer Treatment Plant		Unknown
	Water Treatment Plant		Unknown
	PW Maintenance Yard		Unknown
	Waste Management		Unknown
	PGE		Unknown
	Sportsman Airpark		Unknown
	Frontier Telephone		Unknown
	Western Helicopter		Unknown

### Vulnerability Analysis

The vulnerability analysis development process is thoroughly discussed in the Yamhill County MHMP, Section 6, which generated the following Hazard Exposure Analysis Overviews. Tables 7.6-8, 7.6-9, and 7.6-10 depict in tabular form results obtained from the GIS analysis depicted in hazard figures located in Appendix A.

**Table 7.6-8. City of Newberg Potential Hazard Exposure Analysis Overview-Population and Buildings**

Hazard Type	Hazard Area	Methodology	Population Number	Buildings			
				Residential		Non-Residential	
				Number	Value (\$)	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	1,474	199,579,600	15	unknown
	High	100-year floodplain	--	1,474	199,579,600	15	unknown
Winter Storm		descriptive	22,580	7,736	1,546,167,978	62	unknown
Landslide	Moderate	14-32 degrees	--	2,454	332,271,600	22	unknown
	High	>32 degrees	--	564	79,365,600	3	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	5,566	753,636,400	52	unknown
	High	High fuel rank	--	4,737	641,389,800	60	unknown
	Very High	Very high fuel rank	--	758	102,633,200	5	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	7,736	1,546,167,978	62	unknown
	Very strong	>20-40% (g)	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--
Volcano		descriptive	22,580	7,736	1,546,167,978	62	unknown
Wind		descriptive	22,580	7,736	1,546,167,978	62	unknown
Drought		descriptive		--	--	--	--

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$135,400 per structure). Note-population by parcel was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed.

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**Table 7.6-9. City of Newberg Potential Hazard Exposure Analysis Overview-Critical Facilities**

			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	--	--	1	unknown	7	unknown
Winter Storm		descriptive	4	unknown	2	unknown	14	unknown	10	unknown	79	unknown
Landslide	Moderate	14-32 degrees	--	--	--	--	2	unknown	2	unknown	24	unknown
	High	>32 degrees	--	--	--	--	--	--	1	unknown	2	unknown
Wildland Fire	Moderate	Moderate fuel rank	4	unknown	2	unknown	14	unknown	10	unknown	79	unknown
	High	High fuel rank	4	unknown	2	unknown	11	unknown	7	unknown	70	unknown
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	3	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	4	unknown	2	unknown	14	unknown	10	unknown	79	unknown
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	4	unknown	2	unknown	14	unknown	10	unknown	79	unknown
Wind		descriptive	4	unknown	2	unknown	14	unknown	10	unknown	79	unknown
Drought		descriptive	--	--	--	--	--	--	--	--	--	--

<sup>1</sup> ó values not available at this time

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**Table 7.6-10. City of Newberg Potential Hazard Exposure Analysis Overview-Critical Infrastructure**

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	2	unknown	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	4	unknown	--	--	1	unknown	--	--
Winter Storm		descriptive	6	unknown	1	unknown	6	unknown	--	--	12	unknown	--	--
Landslide	Moderate	14-32 degrees	--	--	--	--	5	unknown	--	--	7	unknown	--	--
	High	>32 degrees	--	--	--	--	2	unknown	--	--	1	unknown	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	6	unknown	1	unknown	11	unknown	--	--
	High	High fuel rank	--	--	--	--	6	unknown	--	--	10	unknown	--	--
	Very High	Very high fuel rank	--	--	--	--	2	unknown	--	--	2	unknown	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	6	unknown	1	unknown	6	unknown	--	--	12	unknown	--	--
Wind		descriptive	6	unknown	1	unknown	6	unknown	--	--	12	unknown	--	--
Drought		descriptive	--	--	--	--	--	--	--	--	--	--	--	--

<sup>1</sup> 6 values not available at this time

## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards identified in the 2014 Yamhill County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Newberg. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

### ***Winter Storm***

Winter storms have widespread impacts that are most often the result of the ice, cold, high winds and flooding they bring. Damage to facilities and infrastructure can be severe, depending on the intensity of the storm event.

### ***Landslide***

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Newberg. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Newberg has critical facilities and infrastructure located within areas with moderate, high, and very high fuel ranks

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### ***Earthquake***

Based on PGA shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Newberg is in the eastern portion of Yamhill County, in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake, and for a strong designation corresponds to 9-20 percent of the acceleration of gravity.

### ***Volcano***

As discussed in Chapter 5, volcanic activity is most likely to impact Yamhill County and the City of Newberg in the form of ashfall or tephra. Damage is likely to result from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, and can distribute acid rain as sulfur dioxide gas mixes with water. Additionally, these particles can create a risk of suffocation as carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals. They further pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

However, due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that the entire population is at risk.

### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Newberg are equally at risk of a windstorm event.

### ***Drought***

State-wide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the City of Newberg's local economy such as agriculture, fishing, and timber have historically been affected, and any future droughts would have tangible economic and potentially human impacts.



## **MITIGATION STRATEGY**

### **IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

#### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

##### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.6-11, or to revise them to more fully meet the City's needs. The City then proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 7.6-12 depicts the City's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.6-12 delineate those actions the city will strive to implement within this five year planning cycle.

#### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

##### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

##### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City of Newberg actively participates in FEMA's National Flood Insurance Program (NFIP) and have implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties. They subsequently selected and prioritized City appropriate actions to assure an effective flood mitigation program.

**MITIGATION GOALS AND ACTION ITEMS CONSIDERED**

<b>Table 7.2-11. 2014 Yamhill County Mitigation Goals-Considered</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

**DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions**

**Local Planning Updates and Revisions**

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

**Element**

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

Source: FEMA, March 2013.

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**Table 7.6-12. City of Newberg Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	<b>New</b>		Integrate the Mitigation Plan findings into planning & regulatory documents & programs and into enhanced emergency planning.
MH	<b>New</b>		Develop early warning test program: partnering with NOAA, city police, fire department to coordinate test.
MH	<b>New</b>		Review critical facilities & gov't buildings structures
MH	<b>Ongoing</b>		Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	<b>Ongoing</b>		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	<b>Ongoing</b>		Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH	<b>Ongoing</b>		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	<b>Ongoing</b>		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	<b>Ongoing</b>	Funding Dependent	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	<b>Ongoing</b>		Install lightning rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	<b>Ongoing</b>	Should be a priority	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	<b>Ongoing</b>		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Consider		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
MH	<b>Ongoing</b>		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
MH	<b>Ongoing</b>		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Consider		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	Consider		Identify and pursue funding opportunities to implement mitigation actions.

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**Table 7.6-12. City of Newberg Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
MH	Consider		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Consider		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
Flood	<b>Ongoing</b>		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Consider		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Consider	Lack of staff available	Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	Consider	Should be a priority	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	<b>Ongoing</b>		Develop, implement, and enforce floodplain management ordinances.
Flood	Consider		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Consider		Install new stream flow and rainfall measuring gauges.
Flood	<b>Ongoing</b>		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Consider		Construct earthen berms to divert flood flows into bridge or culvert openings. The earth fill should be erosion-resistant and the berms should be covered with erosion-resistant fabric, armoring materials, or vegetation.
Flood	Consider		Increase culvert size to increase its drainage efficiency.
Flood	Consider		Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
Flood	<b>Ongoing</b>		Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
Flood	Consider		Construct debris deflectors to deflect the major portion of debris away from culvert entrances and bridge piers. They are normally "V" shaped.
Flood	Consider		Install debris fins upstream of a culvert to align debris so that the debris will pass through a drainage opening without clogging the inlet. They are sometimes used on bridge piers to deflect drifting materials.
Flood	Consider		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Consider		Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events. .
Flood	Consider		Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Winter	<b>Ongoing</b>		Develop and implement strategies and educational outreach programs for debris management from severe

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**Table 7.6-12. City of Newberg Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Storm			winter storms.
Winter Storm	Consider		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm	<b>Ongoing</b>		Update or develop, implement, and maintain jurisdictional debris management plans.
Winter Storm	<b>Ongoing</b>		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Consider		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storm	<b>Ongoing</b>		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm	<b>Ongoing</b>		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storm	Consider		Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storm	Consider		Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
Winter Storm	<b>Ongoing</b>	Priority	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storm	<b>Ongoing</b>		Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Consider		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
Landslide	<b>Ongoing</b>		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Consider		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	<b>Ongoing</b>		Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	<b>Ongoing</b>		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	<b>Ongoing</b>		Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Consider		Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.

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**Table 7.6-12. City of Newberg Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Landslide	Consider		Identify and seasonally restrict recreational and construction activities in high landslide areas.
Landslide	Consider		Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
Wildland Fire	<b>Ongoing</b>		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	<b>Ongoing</b>		Provide real-time internet access and interagency cooperation to decrease wildland fire warning times.
Wildland Fire	Consider		Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	Consider		Promote FireWise building siting, design, and construction materials.
Wildland Fire	Consider		Develop FireWise Public Service Announcements (PSA).
Wildland Fire	<b>Ongoing</b>		Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	<b>Ongoing</b>	Priority	Schedule and perform government facility "fire drills" at least twice per year.
Wildland Fire	<b>Ongoing</b>		Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire	<b>Ongoing</b>		Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	<b>Ongoing</b>		Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.
Wildland Fire	<b>Ongoing</b>		Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
Earthquake	<b>Ongoing</b>		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider		Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Consider		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	<b>Ongoing</b>		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	<b>Ongoing</b>	(county &	Retrofit bridges that are not seismically adequate for lifeline transportation routes.

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**Table 7.6-12. City of Newberg Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
		state bridges)	
Earthquake	<b>Ongoing</b>		Update existing (or adopt the most current) Uniform Building Code
Earthquake	<b>Ongoing</b>		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	<b>Ongoing</b>		Inspect and/or certify all new construction.
Earthquake	<b>Ongoing</b>		Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.
Earthquake	<b>Ongoing</b>		Develop outreach program to educate population concerning household, business, and public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.
Earthquake	<b>Ongoing</b>		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	<b>Ongoing</b>	As money permits	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	<b>Ongoing</b>		Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	<b>Ongoing</b>	Priority	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	<b>Ongoing</b>		Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	<b>Ongoing</b>		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	<b>Ongoing</b>		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Volcano	Consider		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Consider		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Consider		Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
Volcano	Consider		Evaluate ash impact on storm water drainage system and develop mitigation actions.
Wind	<b>Ongoing</b>	for new construction	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	<b>Ongoing</b>		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	<b>Ongoing</b>		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down

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**Table 7.6-12. City of Newberg Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
			damage when upgrading or during new development.
ENSO	Consider		Educate public regarding weather patterns associated with El Niño / La Niña.
Drought	<b>Ongoing</b>	Priority	Develop educational programs and initiatives related to water conservation and irrigation during drought periods.
DUTS	<b>Ongoing</b>		Develop outreach program to educate and encourage residents to maintain several days of emergency supplies for power outages or road closures.
DUTS	<b>Ongoing</b>		Review and update emergency response plans for utility disruptions.
DUTS	Ongoing		Review and update emergency response plans for transportation route disruptions.
DUTS	<b>Ongoing</b>		Identify and prioritize all jurisdiction owned+ & non-jurisdiction owned+critical facilities that have backup power and emergency operations plans.
DUTS	Consider	As funding permits	Purchase backup power systems for all identified critical facilities.
HAZMAT	<b>Ongoing</b>		Annually review and update HAZMAT inventories and ensure that emergency responders are trained for site-specific incidents.
HAZMAT	<b>Ongoing</b>		Enhance emergency planning, emergency response training, and equipment acquisition to address hazardous materials incidents for emergency and first responders and public works staff.
HAZMAT	<b>Ongoing</b>		Evaluate existing security measures for sites with large quantities of hazardous substances (HS) or any quantities of extremely hazardous substances (EHS) and enhance security as necessary.
HAZMAT	<b>Ongoing</b>		Evaluate seismic bracing/anchoring for sites with large quantities of HS or any quantities of EHS.
HAZMAT	<b>Ongoing</b>	Priority	Train Public Works staff to identify EHS and to follow EMS protocols.
HAZMAT	Consider		Develop outreach program to educate the public regarding chemical hazards, safe handling, storage, and disposal procedures.
HAZMAT	<b>Ongoing</b>		Research, develop, and implement methods to protect waterways from hazardous materials events.
HAZMAT	<b>Ongoing</b>		Prepare a site-specific summary of hazardous materials used, stored, and commonly transported in the jurisdictional area. The summary should include mapped facility locations with a hazardous materials inventory, emergency response protocols, and mitigation actions.
Terrorism	Consider		Enhance emergency planning, organization, equipment, exercise, and emergency response training to address all potential terrorism incidents.
Terrorism	<b>Ongoing</b>		Upgrade physical security, detection, and response capability for critical facilities using information obtained from hazard assessments and risk analysis. Include water systems and any high-profile facilities such as major timber industry facilities and sites with large quantities of HS and EHS.



## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of the City of Newberg's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Newberg's highest priority mitigation actions. This does not preclude implementing additional goals and actions during the course of this plan.

## MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Newberg reviewed the Yamhill County goals and determined they meet the City's needs and subsequently implemented the Goals in Table 7.6-13 for the current planning period.

<b>Table 7.2-13 City of Newberg Mitigation Goals</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the City, County and other local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in the City of Newberg.
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

#### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or

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issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section II and the Hazard Annexes.

### ***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the MHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

### ***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

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***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan

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five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin on the particular action.

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Integrate the Mitigation Plan findings into planning & regulatory documents & programs and into enhanced emergency planning.		<i>Preventive and Emergency Operations</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Development Code; Emergency Operation Plan			
<b>Rationale for Proposed Action Item:</b>			
To integrate Hazard Mitigation Plan goals in day to day planning & development			
<b>Ideas for Implementation:</b>			
Hazard Mitigation Plan review by council, Departments & stakeholders Revision of codes/plans as required Meet with emergency management team semi-annually to ensure plan integration			
<b>Coordinating Organization:</b>		Emergency Management Team (EMT)	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Building/Planning & Emergency Management Team		Planning Commission, school districts, Non-Governmental Organization, Council, Yamhill County	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General fund/Grants		TBD	<b>Ongoing</b> Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Brittney Jeffries & Mary Newell		
<b>Action Item Status:</b>	New		

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Develop early warning test program: partnering with NOAA, city police, fire department to coordinate test.		<i>Education &amp; Outreach, Emergency Operations</i>	
<b>Alignment with Existing Plans/Policies:</b>			
EOP, Emergency Alert System, Communications Plan Emergency Operations Plan			
<b>Rationale for Proposed Action Item:</b>			
To update & train city staff in emergency notification procedures for all Hazard Alerts			
<b>Ideas for Implementation:</b>			
Develop policy for activating Code Red Continue dispatcher training on state EAS system Formalize Public Information Officer information dissemination process			
<b>Coordinating Organization:</b>		Emergency Management Team & Communications	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Department Heads, City Council		Oregon Emergency Management, Yamhill County Emergency Management	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General fund		No Cost	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	Mary Newell & Brittney Jeffries		
<b>Action Item Status:</b>	New		



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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Review critical facilities & gov't buildings structures		<i>Preventive and Implementation</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Building codes			
<b>Rationale for Proposed Action Item:</b>			
Evaluate critical city infrastructures to withstand multi-hazard conditions			
<b>Ideas for Implementation:</b>			
Facility walkthrough/evaluation in Buildings, pump stations, etc with building inspector & public work & engineering staff			
<b>Coordinating Organization:</b>		EMT	
<b>Internal Partners:</b>		<b>External Partners:</b>	
Staff, Department Heads, Public Works, Engineering and Administration		Utilities	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General fund/ Grants/ Bonds		TBD	<b>Ongoing</b> Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Mary Newell & Brittney Jeffries		
<b>Action Item Status:</b>	New		

## **7.7 CITY OF SHERIDAN**

This addendum contains specific City of Sheridan information to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section supports the City of Sheridan's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Sheridan is located in south Yamhill County. The city's 2013 population was 6,180. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 5.5 percent of the population is under five years of age, 70.6 percent are between the ages of 18 and 64, and 8.2 percent of the population is 65 years or older. Of the City of Sheridan's 2,281 residents eligible for the labor force, 1,898 were employed, and the unemployment rate was 7.8 percent. The 2012 median household income was \$42,228 and the median family income was \$41,882. The City of Sheridan's per capita income in 2012 was \$13,360. Fourteen and six-tenths percent of the City's families were living below the poverty level in 2012. In that same year, 16.9 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

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### DMA 2000 Requirements: Planning Process

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

#### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Sheridan is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill that goal, the City organized a Hazard Mitigation Plan development Steering Committee dedicated to identifying hazard threats and developing actions that can be taken to mitigate damage and life losses from those threats.

Table 7.7-1 contains the City's Steering Committee participant list to augment the Yamhill County MHMP planning elements.

Table 7.7-1. City of Sheridan Steering Committee	
Name	Agency/Department/Affiliation
Yvonne Hamilton	Deputy City Recorder
Frank Sheridan	City Manager
Kie Cottam	Director of Public Works

**Comment [AD5]:** Please update Steering Committee members

Table H6 2 contains the summary of the City's public involvement and planning meeting activities.

Table 7.7-2. City of Sheridan Public Involvement Mechanisms	
Mechanism	Description
City News letter	Direct citizens to survey, 2009 HMP, meeting dates and information provided on city web site concerning local hazards
July 2nd 2014 Chamber of Commerce 1st Wednesday.	Hand out flyers highlighting Hazard Mitigation, 1st Wednesday event hosted by Chamber of Commerce. Include date for public meeting.
Newsletter Distribution	Ask for public input and comment on Hazard Mitigation Plan.
Community Meeting	Final discussion of public input and comment.
August 15, 2008 Countywide Public Meeting, 10 a.m., 2 p.m., Yamhill County Public Works Auditorium, McMinnville, OR	Adoption of revised Hazard Mitigation Plan.

**Comment [AD6]:** Update Public Involvement Summary Table

## CAPABILITY ASSESSMENT

Table 7.7-3, 7.7-4, and 7.7-5 contain the City's resources used to support planning activities.

**Table 7.7-3. City of Sheridan Legal and Regulatory Resources Available for Hazard Mitigation**

**Comment [AD7]:** Update this table. See section 3.4 for additional plans to consider

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Emergency Operations Plan (2006)	Identifies emergency planning, policies, procedures, and response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies.
	Comprehensive Plans	Guides governance, development, land-use, and floodplain management
	FEMA Flood Mitigation Plan	2/3 of Sheridan is within the 100 year floodplain. Plan includes ordinances and requirements to carefully evaluate development and restrict floodplain changes.
	Sheridan Area Waste Treatment Management Plan	Sheridan is designate as a Sewerage Works Implementation Agency. This plan delineates responsibility for waste management an essential aspect for ensuring waste is not sited near water sources, minimized environmental impact, and health and safety of community.
	Sheridan Transportation System Plan	Designates arterial, collector, and local street and proposed street to prioritize street development and maintenance.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	CRS Community	Has rating of 8-effective floodplain ordinances reduce flood impact and shows community is effectively striving to mitigate flood damages.
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	Provides for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency. Provides information concerning known hazards
	Title 8.70 Hazardous Materials Releases	Provides procedure for coordination among various agencies in the event of hazardous materials releases. Provides information concerning known hazards
	Development Code	Development Codes in Comp Plan. Regulates building and land-use development within hazard areas.
	Subdivision Ordinances	Establishes regulations and standard for subdividing and land partitioning within the City. Transportation improvements, public facilities and services, energy conservation and recreational standards are specifically addressed during the review procedure for a subdivision plat or partitioning request.
	Zoning Ordinances	Implementation of various community resource policies restricting development within hazard areas

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**Table 7.7-3. City of Sheridan Legal and Regulatory Resources Available for Hazard Mitigation**

**Comment [AD7]:** Update this table. See section 3.4 for additional plans to consider

Regulatory Tool	Name	Effect on Hazard Mitigation
Policies (Municipal Codes)	Site Design Review	Evaluates commercial and industrial development impact to community resources. Ensures aesthetically pleasing, sited to efficiently use public services, and planning actions to best benefit the community, and ensures sustainability from hazards
	Building Codes	Help to assure safety housing by defining standard for structural strength and standards for fire, safety, plumbing and electrical installation.
	Agency Review and Coordination	Ensures buildings comply with established codes to ensure sustainability from hazards
	Mobile Homes and Mobile Home Parks	Standards and restrictions pertaining to mobile homes and mobile home parks locations. Ensures they are not sited within hazard zones and ensures they resist damages from known hazards.

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**Table 7.7-4. City of Sheridan Administrative and Technical Resources for Hazard Mitigation**

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Contract engineer; planner contract - Jim Jenks Mid-Willamette council of Governments
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Yes, Murray Smith and Assoc, PE
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Yes
Floodplain manager	Jim Jenks (City Planner & Floodplain Manager)
Personnel skilled in GIS and/or HAZUS-MH	No
Director of Emergency Services	Frank Sheridan (City Manager)
Finance (grant writers, purchasing)	Joel Wade (Finance Director) Contract out grant writing
Public Information Officers	Frank Sheridan

Comment [AD8]: Please update as needed

**Table 7.7-5. City of Sheridan Financial Resources for Hazard Mitigation**

Financial Resources	Effect on Hazard Mitigation
General funds	Limited
Authority to levy taxes for specific purposes	Vote of citizens
Incur debt through general obligation bonds	Up to \$50,000 then a vote of the people
Incur debt through special tax and revenue bonds	Revenue bonds, Enterprise funds for water and sewer, don't think can incur debt through special tax
Incur debt through private activity bonds	Economic Development through the State
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

Comment [AD9]: Please update as needed

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

#### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The City of Sheridan's Steering Committee determined that the following hazards could potentially threaten the community. Those identified with an (x) are specific to the City of Sheridan.

<i>Natural Hazards</i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	
Drought	X

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for the City of Sheridan to augment the MHMP development process. It comprises:

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Sheridan actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.



**DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment**

**Assessing Vulnerability: Multi-Jurisdictional Risk Assessment**

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

**Element**

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## **VULNERABILITY ANALYSIS**

### **Asset Inventory**

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.7-6A, 7.7-6B, and 7.7-7. Tables 7.7-8, 7.7-9, and 7.7-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Sheridan seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### **Population and Building Stock**

Population data listed in Table 7.7-6A were obtained from the 2000 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.7-6A, 7.7-6B, and 7.7-7.

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Table 7.7-6A. City of Sheridan Estimated Population and Building Inventory				
Population			Residential Buildings	
2000 Census	Estimated 2005 Census	Estimated 2013 Census <sup>2</sup>	Total Building Count	Total Value of Buildings (\$) <sup>1</sup>
3,570	5,785	6,180	1,364	153,782,529 <sup>2</sup>

**Comment [AD10]:** Please update Residential Building Information if new information is available

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$109,400 per structure).

<sup>2</sup> Portland State University (PSU) 2014 Oregon Population Report.

Table 7.7-6B. City of Sheridan NFIP Insurance Report								
City of	Total Premiums (\$)	Policies A-Zone	Total Policies	Total Coverage (\$)	Average Premium (\$)	Total Claims Since 1978	Total Paid Since 1978 (\$)	Rep Loss Properties <sup>2</sup>
Sheridan	338,952	489	525	75,368,400	645.62	52	761,088	1

**Source:** FEMA NFIP Insurance Report June 23, 2008  
FEMA SQANet.

<sup>2</sup>Content and building claims.

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**Table 7.7-7. City of Sheridan Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	Sheridan City Hall	120 SW Mill St.	\$135,139.00
	Public Works Department	358 NW Washington St.	Unknown
	Sheridan Post Office	148 SE Harney St.	Unknown
	Other Sheridan Assets	Unknown	\$1,042,574.00
Emergency Response	City of Sheridan Fire Department	230 SW Mill St.	Unknown
	City of Sheridan Police Department		Unknown
Educational	Faulconer-Chapman School (A-8)	332 SW Cornwall St.	Unknown
	Sheridan High School (9-12)	433 S. Bridge St.	\$202,895.00
	Opportunity House (9-12)	437 S. Bridge St.	Unknown
	Sheridan Japanese School (4-12)	430 SW Monroe St.	Unknown
	The Delphian School (Private Boarding School [A-12])	20950 SW Rock Creek Road	Unknown
	West Valley Academy (1-12)	9015 DeJong Road, Sheridan	Unknown
Health Care	Sheridan Care Center (Intermediate Care)	411 SE Sheridan Rd.	Unknown
Community	Sheridan City Park	NE Yamhill St. by Blair St.	Unknown
	Edward R Moore Park		Unknown
	Municipal Pool ?		Unknown
	Sheridan Public Library	142 NW Yamhill St.	Unknown
	Greencrest Memorial Park (Cemetery)	108 NW Lincoln St.	Unknown
	Masonic Cemetery	At end NW Evans St.	Unknown
	William Savage House		Unknown
	Walter Sleepy House		Unknown
	Travelerø Home (formerly Savage-Mendenhall-Seth House)	147 NE Yamhill St.	Unknown
	Seventh-Day Adventist Church	940 W. Main St.	Unknown
	Church of the Nazarene	917 S. Bridge St.	\$35,309.00
	Open Door Community Church	339 NW Sheridan St.	\$136,510.00
	Good Shepherd Church	127 NE Hill St.	Unknown
	New Hope Christian Church	919 SW 2nd St.	Unknown
	First Christian Church	121 NE Yamhill St.	Unknown
	Trinity Lutheran Church	311 SE Schley St.	\$98,610.00
	Mennonite Church	240 SW Madison St.	Unknown
	Sheridan Methodist Church	234 N. Bridge St.	\$91,715.00
	Kingdom Hall of Jehovahø Witnesses	825 W. Main St.	\$32,918.00
	Baptist Church	643 E. Main St.	\$56,594.00
	Sheridan Sun Newspaper	147 NE Yamhill St.	Unknown

**Comment [AD11]:** Please update with any facilities new since 2009

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**Table 7.7-7. City of Sheridan Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
State and Federal Highways	State Highway 18	4 miles	
Railroads	Willamette & Pacific Railroad	2.75 miles	
Bridges	Sheridan Bride over the Sough Yamhill River Bridge		Unknown
Transportation Facilities- Listed as Utilities under Critical Facilities Folder	Sheridan Airport (small airport)	21821 SW Rock Cr Rd	Unknown
	Yamhill Community Action Program (handicapped and elderly)	800 NE 2nd St., McMinnville	Unknown
	Greyhound Bus Service		Unknown
	Taylor Lumber Site RR Spur	22100 SW Rock Creek Rd	Unknown
	Industrial Area RR Spur		Unknown
Utilities	South Yamhill River Water Supply & Treatment		Unknown
	Sheridan Area Waste Treatment Plant		Unknown
	United Telephone Co of the Northwest		Unknown
	Lift Station		Unknown

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

**Comment [AD11]:** Please update with any facilities new since 2009

### Vulnerability Analysis

The vulnerability analysis development process is thoroughly discussed in the Yamhill County MHMP, Section 6, which generated the following Hazard Exposure Analysis Overviews. Tables 7.7-8, 7.7-9, and 7.7-10 depict in tabular form results obtained from the GIS analysis depicted in hazard figures located in Appendix A.

**Table 7.7-8. City of Sheridan Potential Hazard Exposure Analysis Overview-Population and Buildings**

Hazard Type	Hazard Area	Methodology	Population Number	Buildings			
				Residential		Non-Residential	
				Number	Value (\$) <sup>1</sup>	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	1050	114,870,000	10	unknown
	High	100-year floodplain	--	1029	112,572,600	10	unknown
Winter Storm		descriptive	5,785	1,364	149,221,600	10	unknown
Landslide	Moderate	14-32 degrees	--	599	65,530,600	2	unknown
	High	>32 degrees	--	100	10,940,000	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	1,116	122,090,400	10	unknown
	High	High fuel rank	--	883	96,600,200	10	unknown
	Very High	Very high fuel rank	--	281	30,741,400	1	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--
Earthquake	Strong	9-20% (g)	5,785	1,364	149,221,600	10	unknown
	Very strong	>20-40% (g)	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--
Volcano		descriptive	5,785	1,364	149,221,600	10	unknown
Wind		descriptive	5,785	1,364	149,221,600	10	unknown
Drought		descriptive	--	--	--	--	--

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$109,400 per structure). Note-population by parcel was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed. 0.25 mile-buffered EHS sites were not calculated due to the use of census block level data.

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**Table 7.7-9. City of Sheridan Potential Hazard Exposure Analysis Overview-Critical Facilities**

Hazard Type	Hazard Area	Methodology	Government		Emergency Response		Educational		Care		Community	
			No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	5	35K
	High	100-year floodplain	3	135K	2	unknown	4	203K	1	unknown	16	452K
Winter Storm		descriptive	4	1.2M	2	unknown	6	203K	1	unknown	21	452K
Landslide	Moderate	14-32 degrees	--	--	--	--	1	unknown	--	--	4	134K
	High	>32 degrees	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	3	135K	2	unknown	5	203K	1	unknown	17	452K
	High	High fuel rank	2	unknown	1	unknown	2	unknown	--	--	12	318K
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	2	57K
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	4	1.2M	2	unknown	6	203K	1	unknown	21	452K
Wind		descriptive	4	1.2M	2	unknown	6	203K	1	unknown	21	452K
Drought		descriptive	4	1.2M	2	unknown	6	203K	1	unknown	21	452K

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**Table 7.7-10 City of Sheridan Potential Hazard Exposure Analysis Overview-Critical Infrastructure**

			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	1	unknown	--	--	1	unknown	--	--
Winter Storm		descriptive	4	unknown	2.75	unknown	1	unknown	5	unknown	4	unknown	--	--
Landslide	Moderate	14-32 degrees	--	--	--	--	1	unknown	1	unknown	--	--	--	--
	High	>32 degrees	--	--	--	--	--	--	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	1	unknown	1	unknown	3	unknown	1	unknown	--	--
	High	High fuel rank	--	--	--	--	1	unknown	3	unknown	--	--	--	--
	Very High	Very high fuel rank	--	--	--	--	1	unknown	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	4	unknown	2.75	unknown	1	unknown	5	unknown	4	unknown	--	--
Wind		descriptive	4	unknown	2.75	unknown	1	unknown	5	unknown	4	unknown	--	--
Drought		descriptive	4	unknown	2.75	unknown	1	unknown	5	unknown	4	unknown	--	--

## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards in addition to technological and manmade hazards identified in the 2009 Yamhill County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Sheridan. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

In the City of Sheridan, 1,029 residential structures (value \$112.6M), ten non-residential structures (value unknown), three government facilities (value \$135K), two emergency response facilities (values unknown), four educational facilities (value \$203K), one care facility (value unknown), 16 community facilities (value \$452K), one bridge (value unknown), and one utility (value unknown) are located within the boundaries of the 100-year floodplain and therefore accorded a high flood risk.

The 500-year floodplain contains 1,050 residential structures (value \$114.9M), ten non-residential structures (value unknown) and five community facilities (value \$35K) with a moderate flood risk.

### ***Winter Storm***

Winter storms have widespread impacts that are most often the result of the ice, cold, high winds and flooding they bring. Damage to facilities and infrastructure can be severe, depending on the intensity of the storm event.

Since winter storms are regional events, the entire City of Sheridan can be equally affected. Therefore 5,785 residents, 1,364 residential structures (value \$149.2M), 10 non-residential structures (value unknown), four government facilities (value \$1.2M), two emergency response facilities (value unknown), six educational facilities (value \$203K), one care facility (value unknown), 21 community facilities (value \$452K), four highway segments (value unknown), 2.75 railroad segments (value unknown), one bridge (value unknown), five transportation facilities (value unknown), and four utilities (value unknown) are at risk.

### ***Landslide***

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing



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electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

USGS elevation datasets were used to determine the landslide hazard areas within the City of Sheridan. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Using these guidelines, the City of Sheridan has 599 residential structures (value \$65.5M), two non-residential structures (value unknown), one educational facility (value unknown), four community facilities (value \$134K), one transportation facility (value unknown) and one bridge (value unknown) located in areas of moderate risk.

There are 100 residential structures (value \$10.9M) and no identified critical facilities located in areas of high risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Sheridan has critical facilities and infrastructure located within areas with moderate, high, and very high fuel ranks. Moderate fuel rank areas contain 1,116 residential structures (value \$122M), ten non-residential structures (value unknown), three government facilities (value \$135K), two emergency response facilities (value unknown), five educational facilities (value \$203K), one care facility (value unknown), 17 community facilities (value \$452K), one bridge (value unknown), three transportation facilities (value unknown), one railroad (value unknown), and one utility (value unknown).

High fuel rank areas contain 883 residential structures (value \$96.6M), ten non-residential structures (value unknown), two government facilities (value unknown), one emergency response facility (value unknown), two educational facilities (values unknown), 12 community facilities (value \$318K), three transportation facilities (value unknown), and one bridge (value unknown).

Very high fuel rank areas contain 281 residential structures (value \$30.7M), one non-residential structures (value unknown), two community facilities (value \$57K), and one bridge (value unknown).

### ***Earthquake***

Based on PGA shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable

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slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Sheridan is in the eastern portion of Yamhill County, in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake, and for a strong designation corresponds to 9-20 percent of the acceleration of gravity.

The entire City of Sheridan can be equally affected by strong shaking earthquakes. Therefore 5,785 residents, 1,364 residential structures (value \$149.2M), 10 non-residential structures (value unknown), four government facilities (value \$1.2M), two emergency response facilities (value unknown), six educational facilities (value \$203K), one care facility (value unknown), 21 community facilities (value \$452K), four highway segments (value unknown), 2.75 railroad segments (value unknown), one bridge (value unknown), five transportation facilities (value unknown), and four utilities (value unknown) are at risk.

### ***Volcano***

As discussed in Chapter 5, volcanic activity is most likely to impact Yamhill County and the City of Sheridan in the form of ashfall or tephra. Damage is likely to result from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, and can distribute acid rain as sulfur dioxide gas mixes with water. Additionally, these particles can create a risk of suffocation as carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals. They further pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

However, due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that the entire population is equally at risk. This includes 5,785 residents, 1,364 residential structures (value \$149.2M), 10 non-residential structures (value unknown), four government facilities (value \$1.2M), two emergency response facilities (value unknown), six educational facilities (value \$203K), one care facility (value unknown), 21 community facilities (value \$452K), four highway segments (value unknown), 2.75 railroad segments (value unknown), one bridge (value unknown), five transportation facilities (value unknown), and four utilities (value unknown).

### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Sheridan are equally at risk of a windstorm event. Therefore 5,785 residents, 1,364 residential structures (value \$149.2M), 10 non-residential structures (value unknown), four government facilities (value \$1.2M), two emergency response facilities (value unknown), six educational facilities (value \$203K), one care facility (value unknown), 21

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community facilities (value \$452K), four highway segments (value unknown), 2.75 railroad segments (value unknown), one bridge (value unknown), five transportation facilities (value unknown), and four utilities (value unknown) are at risk.

### ***Drought***

State-wide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the City of Sheridan's local economy such as agriculture, fishing, and timber have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

## **MITIGATION STRATEGY**

### **IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

#### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

##### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.7-11, or to revise them to more fully meet the city's needs. The committee proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects used to achieve the goals of a mitigation plan. Table 7.7-12 depicts the city's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.7-12 delineate those actions the city will strive to implement within this five year planning cycle.

The City of Sheridan actively participates in FEMA's National Flood Insurance Program (NFIP) and have implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

#### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

##### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

##### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties. They subsequently selected and prioritized City appropriate actions to assure an effective flood mitigation program.

## MITIGATION GOALS AND ACTION ITEMS CONSIDERED

Table 7.7-11. 2014 Yamhill County Mitigation Goals-Considered	
Goal Number	Goal Description
1	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
7	DEVELOPMENT <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

### DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions

#### Local Planning Updates and Revisions

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

#### Element

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

Source: FEMA, March 2013.

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**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	New		Establish a Hazard Mitigation Planning committee
MH	New		Identify and pursue funding opportunities to implement mitigation processes
MH	Ongoing		Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	Ongoing		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	Ongoing		Review ordinances and develop outreach programs to assure above ground fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH	Ongoing		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	Ongoing		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	Deferred	PGE is local Power company, sent request.	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.
MH	Ongoing		Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	Ongoing		Install lightening rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Ongoing		Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	Ongoing		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.
MH	Delete	Not required per building code, not a	Install storm shutters, hurricane clips, bracing systems etc. to meet or exceed applicable building codes while reducing disaster damages.

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**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

Hazard	Status	Comment	Description
		problem in our area	
MH	Ongoing		Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
MH	Ongoing		Develop vegetation projects to restore clear cut and riverine erosion damage and to increase landslide susceptible slope stability.
MH	Ongoing		Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Ongoing		Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
MH	Ongoing		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	Ongoing		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	Ongoing		Identify and pursue funding opportunities to implement mitigation actions.
MH	Ongoing		Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Ongoing		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
<b>Flood</b>			
Flood	Ongoing		Work with the MWVCOG GIS staff to develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Ongoing		Work with the MWVCOG GIS staff to develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Ongoing		Work with the MWVCOG GIS staff to develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood	Ongoing		Develop and implement mitigation actions for repetitive loss properties.
Flood	Ongoing		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood	Ongoing		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Ongoing		Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	Ongoing		Request DOGAMI debris flow and lahar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.
Flood	Ongoing		Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding

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**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

Hazard	Status	Comment	Description
			and significant damages or road closures.
Flood	Ongoing		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	Ongoing		Develop, implement, and enforce floodplain management ordinances.
Flood	Ongoing		Develop outreach program to educate residents concerning flood proofed water and sewer system installation.
Flood	Ongoing		Acquire, relocate, elevate, or otherwise flood-proof identified properties.
Flood	Ongoing		Acquire, relocate, elevate, or otherwise flood-proof critical facilities.
Flood	Ongoing		Install new streamflow and rainfall measuring gauges.
Flood	Ongoing		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Ongoing		Dry flood proof non-residential structures.
Flood	Ongoing		Dry flood proof historic structures.
Flood	Ongoing		Increase culvert size to increase its drainage efficiency.
Flood	Ongoing		Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
Flood	Ongoing		Construct debris deflectors to deflect the major portion of debris away from culvert entrances and bridge piers. They are normally "V" shaped.
Flood	Ongoing		Install debris fins upstream of a culvert to align debris so that the debris will pass through a drainage opening without clogging the inlet. They are sometimes used on bridge piers to deflect drifting materials.
Flood	Ongoing		Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	DELETE	No Dams or levees in our areas	Construct an emergency spillway at a dam or other structure to relieve excess water contained during high flow periods to reduce dam failure potential.
Flood	Ongoing		Construct floodwalls around the perimeter of a "facility" and extending above the highest flood elevation to keep floodwaters away from the facility. Floodwalls can be made from gabion baskets, concrete, large riprap, etc. Floodwalls should be used with caution as they can also act as a catchment preventing drainage away from the facility.
Flood	DELETE	No City of Sheridan Bridges.	Install triangular or circular flow deflectors on or immediately upstream from bridge footings to deflect water flow and reduce flow velocities preventing footing scour.
Flood	Ongoing		Construct low water crossings in a road prism to carry flood flows from an intermittent drainage
Flood	Ongoing		Construct a high water overflow crossing to carry flood flows from over bank areas.
Flood	Ongoing		Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events.



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**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

Hazard	Status	Comment	Description
Flood	Ongoing		Modify existing culverts by developing a ring compression, by flattening, or beveling the end of a circular culvert to match the angle of the embankment. May need to install flanges to stiffen the beveled section of the culvert.
Flood	Delete	Lack of funding	Construct spur dikes along the embankments to direct flood flows into a bridge opening or away from a continuous impact site.
Flood	Ongoing		Construct concrete wing walls at culvert or bridge entrances and outlets to direct water flow into their openings
Flood	Ongoing		Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood	Delete	Lack of staff and funding	Develop and implement flood risk reduction program and outreach efforts considering upstream storage, channel improvements, and flood walls or levee construction.
Flood	Ongoing		Install dry-hydrants at strategic locations throughout community
Flood	Ongoing		Coordinate sewer lagoon overflow issues from Willamina sewage treatment plant
Flood	Ongoing		Upgrade protection to sewer pump stations
Flood	Ongoing		Upgrade protection to sewer plant and sewer plant emergency generators
Flood	Ongoing		Replace or retrofit force mains to protect river from waster water spillage
Flood	Ongoing		Improve sewer lagoon overflow protection from heavy rain
Flood	Ongoing		Mitigate inflow and infiltration into sanitary sewer main lines
<b>Winter Storm (WS)</b>			
Winter Storm	Ongoing		Develop and implement strategies and educational outreach programs for debris management from severe winter storms.
Winter Storm	Ongoing		Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm	Ongoing		Update or develop, implement, and maintain jurisdictional debris management plans.
Winter Storm	Ongoing		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Ongoing		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storm	Ongoing		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm	Ongoing		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storm	Ongoing		Develop personal use and educational outreach training for a safe tree harvesting program. Implement along utility and road corridors, preventing potential winter storm damage.
Winter Storm	Ongoing		Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storm	DELETE	Lack of Staff	Develop outreach program with school district contests having students develop, display, and explain mitigation

**Jurisdictional Addenda  
City of Sheridan**

**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

Hazard	Status	Comment	Description
			projects or initiatives.
Winter Storm	Ongoing		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storm	Ongoing		Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Deferred		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line severe wind or winter ice storm event failure. PGE is local power company, sent request.
Winter Storm	Ongoing		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
<b>Landslide</b>			
Landslide	Ongoing		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.
Landslide	Ongoing		Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide	COMPLETED		Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc).
Landslide	Ongoing		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide	Ongoing		Develop comprehensive geological landslide and rockslide prone area maps.
Landslide	Ongoing		Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.
Landslide	Ongoing		Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
<b>Wildland Fire</b>			
Wildland fire	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland fire	Ongoing		Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland fire	Deferred	Sent to Jurisdictional Fire Authority	Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland fire	Deferred	Sent to Jurisdictional Fire Authority	Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping

**Jurisdictional Addenda  
City of Sheridan**

**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

Hazard	Status	Comment	Description
Wildland fire	Deferred	Sent to Jurisdictional Fire Authority	Develop a plan to assist rural residents to evacuate through the city.
Wildland fire	Deferred	Sent to Jurisdictional Fire Authority	Provide wildland fire information in an easily distributed format for all residents.
Wildland fire	Ongoing		Schedule and perform government facility "fire drills" at least twice per year.
Wildland fire	Deferred	Sent to Jurisdictional Fire Authority	Develop, adopt, and enforces burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
<b>Earthquake</b>			
Earthquake	Delete	No staff available	Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.
Earthquake	Delete	No staff available	Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Delete	No staff available	Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake	Ongoing		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	Ongoing		Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake	Completed		Work with the county and state Departments of Transportation to identify bridges that are not seismically adequate for lifeline transportation routes.
Earthquake	Ongoing		Update existing (or adopt the most current) Uniform Building Code
Earthquake	Ongoing		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	Ongoing		Inspect and/or certify all new construction.
Earthquake	Deferred	Lack of funds	Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities. Passed to Local School District
Earthquake	Ongoing		Develop outreach program to educate population concerning household, business, and public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.

**Jurisdictional Addenda  
City of Sheridan**

**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Earthquake	Ongoing		Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Ongoing		Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Ongoing		Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.
Earthquake	Ongoing		Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake	Ongoing		Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	Ongoing		Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
Earthquake	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
<b>Volcano</b>			
Volcano	Ongoing		Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	Ongoing		Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	Ongoing		Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
Volcano	Ongoing		Evaluate ash impact on storm water drainage system and develop mitigation actions.
<b>Wind</b>			
Wind	Ongoing		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	Ongoing		Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Ongoing		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind	Deferred	PGE is local power company, passed on to them.	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
<b>Drought</b>			

**Jurisdictional Addenda  
City of Sheridan**

**Table 7.7-12. City of Sheridan Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Drought	Delete	Lack of Staff	Develop outreach agricultural programs that promote reducing topsoil loss during drought conditions and to encourage soil moisture level monitoring to help minimize crop loss. =
Drought	Ongoing		Develop educational programs and initiatives related to water conservation and irrigation during drought periods.

## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of the City of Sheridan's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Sheridan's highest priority mitigation actions.

## Jurisdictional Addenda City of Sheridan

### MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Sheridan reviewed the Yamhill County goals and modified them to better suite the City's needs and subsequently adopted the Goals in Table 7.7-13 for the current planning period.

Table 7.7-13 City of Sheridan Mitigation Goals	
Goal Number	Goal Description
1	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the City, County and other local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in the City of Sheridan
7	DEVELOPMENT <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.
9	PLANNING <i>Goal Statement:</i> Establish a Hazard Mitigation Planning committee to plan, prioritize and manage mitigation actions.
10	ORGANIZE <i>Goal Statement:</i> Cross reference all current Planning, Emergency, Policy, and City of Sheridan Code documents to reference the relevant areas of the Hazard Mitigation Plan.
11	FUNDING <i>Goal Statement:</i> Locate and pursue possible funding sources for action items to implement the Hazard Mitigation Plan in future developments and rehabilitation projects.

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

#### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

Source: FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section II and the Hazard Annexes.



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***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested

## **Jurisdictional Addenda City of Sheridan**

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in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### ***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

### ***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

### ***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

### ***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan's five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin on the particular action.

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Establish a Hazard Mitigation Planning committee		Y-1,2	
<b>Alignment with Existing Plans/Policies:</b>			
Hazard Mitigation Plan			
<b>Rationale for Proposed Action Item:</b>			
Form committee to oversee Hazard mitigation plan and help prioritize the mitigation actions, funding and resources. This group will be formed of local jurisdictions			
<b>Ideas for Implementation:</b>			
Select members from local jurisdictions; City – Administration and Public Works Sheridan Fire district Yamhill County Sheriff's Office Federal Corrections Institute (FCI) Sheridan School District Consulting firm			
<b>Coordinating Organization:</b>		City of Sheridan	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City of Sheridan Administration and Public Works		Yamhill County, Fire, Police, FCI, School District, Consultant	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General fund and Public Works funds		To Be Determined (TBD)	<b>Ongoing</b> Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Kie Cottam		
<b>Action Item Status:</b>	New		

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## Jurisdictional Addenda City of Sheridan

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Mitigation Hazard plan-Cross reference and incorporate mitigation planning provisions into all City planning processes, emergency plans, transportation plans, and City codes.		Y-1, 2	
<b>Alignment with Existing Plans/Policies:</b>			
Building Code, Traffic System Plan, Development Code, Comprehensive plan, FEMA Flood Mitigation Plan, Emergency Operations Plan. Municipal Codes, and Master Plans.			
<b>Rationale for Proposed Action Item:</b>			
Assist future development to include consideration and recommendations from the Hazard Mitigation Plan.			
<b>Ideas for Implementation:</b>			
Add Addendums to current plans with reference to sections applicable from Hazard mitigation Plan. Have city administration and staff review all current planning documents and master plans.			
<b>Coordinating Organization:</b>		City of Sheridan	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City Administration, Planning, Building Inspector, Public Works		County	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
City of Sheridan		To Be Determined (TBD)	<span style="background-color: yellow;">Ongoing</span> Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Kie Cottam		
<b>Action Item Status:</b>	New		

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Identify and pursue funding opportunities to implement mitigation processes		Y-1, 2	
<b>Alignment with Existing Plans/Policies:</b>			
Hazard Mitigation Plan			
<b>Rationale for Proposed Action Item:</b>			
All action items require funds to conceive, plan and implement. Funding could allow the city to pursue consultants and experts in the relevant fields. External and supplemental funds will allow for a faster implementation of mitigation items. This will also allow the city to consider larger projects that would otherwise be unobtainable with just city resources.			
<b>Ideas for Implementation:</b>			
Hire consultant and have Administration and staff aggressively seek assistance and funding sources.			
<b>Coordinating Organization:</b>		City of Sheridan	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City Administration, City Staff		Police, Fire, Federal, tribal, Willamina, County, State, consultant	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
City and To be determined		To Be Determined (TBD)	<span style="background-color: yellow;">Ongoing</span> Immediate (1-3 years) Long term (4+ years)
<b>Form Submitted by:</b>	Kie Cottam		
<b>Action Item Status:</b>	New		

## **7.8 CITY OF WILLAMINA**

This addendum contains specific City of Willamina information to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section supports the City of Willamina's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Willamina is located in the western Willamette Valley. The city's 2013 population was 2,030. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 4.6 percent of the population is under five years of age, 59.6 percent are between the ages of 18 and 64, and 13.9 percent of the population is 65 years or older. Of the City of Willamina's 861 residents eligible for the labor force, 662 were employed, and the unemployment rate was 15.1 percent. The 2012 median household income was \$34,844 and the median family income was \$47,109. The City's per capita income in 2012 was \$17,536. Fourteen and three-tenths percent of the City of Willamina's families were living below the poverty level in 2012. In that same year, 19.1 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

## Jurisdictional Addenda City of Willamina

### DMA 2000 Requirements: Planning Process

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

#### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### ■ Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Willamina is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill that goal, the City organized a Hazard Mitigation Plan development Steering Committee dedicated to identifying hazard threats and developing actions that can be taken to mitigate damage and life losses from those threats.

Table 7.8-1 contains the City's Steering Committee participant list to augment the Yamhill County MHMP planning elements.

Table 7.8-1. City of Willamina Steering Committee	
Name	Agency/Department/Affiliation
Chris-Ann Harris	Office Coordinator
Jeff Brown	Public Works Superintendent
Charlene Brown	Museum Curator
Dave Morey	Fire Dept
Matt Reneiss	Fire Dept

**Comment [AD12]:** Please update Steering Committee members

Table 7.8-2 contains the summary of the City's public involvement and planning meeting activities.

Table 7.8-2. City of Willamina Public Involvement Mechanisms	
Mechanism	Description
Sheridan Sun Newsletter	Short article explaining the hazard mitigation plan development process- took info from newsletter
Local TV Station WAVE Broadband	Short announcement explaining the hazard mitigation plan development process- took info from newsletter
April Kickoff Newsletter	Distributed in utility bills. Explained plan development process and solicited input and comments.
August 15, 2008 Countywide Public Meeting, 10 a.m., 2 p.m., Yamhill County Public Works Auditorium, McMinnville, OR	Presented risk assessment results and provided opportunity to comment.
August 18, 2008 Countywide Public Meeting, 6 p.m., Yamhill County Public Works	Presented risk assessment results and provided opportunity to comment.

**Comment [AD13]:** Update Public Involvement Summary Table



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**Table 7.8-2. City of Willamina Public Involvement Mechanisms**

Mechanism	Description
Auditorium, McMinnville, OR	

**Comment [AD13]:** Update Public Involvement  
Summary Table

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Table I6 3, 7.8-4, and 7.8-5 contain the City's resources used to support planning activities.

**Table 7.8-3. City of Willamina Legal and Regulatory Resources Available for Hazard Mitigation**

**Comment [AD14]:** Update this table. See section 3.4 for additional plans to consider

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Comprehensive Plan	Guides governance, development, land-use planning, and constructions requirements
	Transportation Plan	Guides transportation route development and identifies potential problem areas
	Emergency Response Plan	Delineates responsibilities during crisis events.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	Provides for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency. Describes known hazards
	Title 8.70 Hazardous Materials Releases	Provides procedure for coordination among various agencies in the event of hazardous materials releases. Describes known hazards
	Zoning Ordinance	Must comply with FEMA reg
	Development Codes	Provides guidance on development in hazard prone areas.

## Jurisdictional Addenda City of Willamina

**Table 7.8-4. City of Willamina Administrative and Technical Resources for Hazard Mitigation**

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Council of Governments Marjorie Mattson-Planner (Contract)
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Yamhill County issues all permits in City limits, Streets and infrastructure use City of Salem Standards (automatically adopt any changes to standards for the City of Salem)
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	City Engineer-Dave Monson (can contract with specific expertise)
Floodplain manager	No
Personnel skilled in GIS and/or HAZUS-MH	Yamhill County for GIS
Director of Emergency Services	Yamhill County Sheriff and Fire Dept
Finance (grant writers, purchasing)	Council of Governments to help with grant writing
Public Information Officers	Chris Ann Harris; Sheriff and Fire Depts

**Comment [AD15]:** Please update as needed

**Table 7.8-5. City of Willamina Financial Resources for Hazard Mitigation**

Financial Resources	Effect on Hazard Mitigation
General funds	Very little
Authority to levy taxes for specific purposes	Yes with a vote of the people
Incur debt through general obligation bonds	Yes
Incur debt through special tax and revenue bonds	Yes
Incur debt through private activity bonds	No
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

**Comment [AD16]:** Please update as needed

## Jurisdictional Addenda City of Willamina

### HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

#### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

##### Identifying Hazards

**Requirement §201.6(c)(2)(i):** [The risk assessment shall include a] description of the type of all natural hazards that can affect the jurisdiction.

##### Element

- Does the new or updated plan include a description of the types of all natural hazards that affect the jurisdiction?

Source: FEMA, July 2008.

The City of Willamina's Steering Committee determined that the following hazards (identified with and X) could potentially threaten the community.

<i>Natural Hazards</i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	X
Wind	X
Erosion	X
Drought	X

**Comment [AD17]:** Please update if needed

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for the City of Willamina to augment the MHMP development process. It comprises:

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Willamina actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.

## Jurisdictional Addenda City of Willamina

### DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment

#### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## VULNERABILITY ANALYSIS

### Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.8-6A, 7.8-6B, and 7.8-7. Tables 7.8-8, 7.8-9, and 7.8-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Willamina seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### Population and Building Stock

Population data listed in Table 7.8-6A were obtained from the 2000 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.8-6A, 7.8-6B, and 7.8-7.

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City of Willamina**

Table 7.8-6A. City of Willamina Estimated Population and Building Inventory				
Population			Residential Buildings	
2000 Census	Estimated 2005 Census	Estimated 2013 Census <sup>2</sup>	Total Building Count	Total Value of Buildings (\$) <sup>1</sup>
1,844	1,860	2,030	730	66,524,471 <sup>2</sup>

**Comment [AD18]:** Please update Residential Building Information if new information is available

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$100,600 per structure).

<sup>2</sup> Portland State University (PSU) 2014 Oregon Population Report.

Table 7.8-6B. City of Willamina NFIP Insurance Report								
City of	Total Premiums (\$)	Policies A-Zone	Total Policies	Total Coverage (\$)	Average Premium (\$)	Total Claims Since 1978	Total Paid Since 1978 (\$)	Rep Loss Properties <sup>2</sup>
Willamina	13,410	7	13	3,610,700	1,031.54	5	18,320	1

**Source:** FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>2</sup>Content and building claims.

## Jurisdictional Addenda City of Willamina

(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, locations have been %shaded+for publication. The data will remain in the report for the County's future mitigation planning efforts)

**Table 7.8-7. City of Willamina Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	Willamina City Hall	411 NE C St	\$325,000
	Library	382 NE C St	\$458,000
	Courthouse	City Hall	see above
	Old PW Shop	250 NW Main	\$118,000
	New PW Shop/Offices	500 SE Adams	\$185,000
Emergency Response	Fire Station	825 NE Main	\$2.9 M
	Elementary & High School	1100 NE Oaken Hills Dr	\$19.3 M
	Middle/Junior High School	out of City	Unknown
	Vocational School	NA	Unknown
	Learning Center	NA	Unknown
	Charter School	NA	Unknown
	College/University	NA	Unknown
Care Facility	Hospital/Emergency Room	NA	Unknown
	Clinic at School	1100 NE Oaken Hills Dr	\$110,000
	Senior Center	340 NE B St	\$85,000
	Medical Office	149 NW 1st	\$175,000
	Retirement Facilities	NA	Unknown
Community	Museum	188 NE D St	\$275,000
	Tina Miller Park-YC	6701 AC11900	Unknown
	Oaken Hills Park-YC	6701 AD5200	Unknown
	Huddleston Park	600 NE Yamhill	\$700,000
	Garden Spot Park-YC	6701 DB100	Unknown
	Lamson Park-YC	6701 DB300	Unknown
	Cemetery-no address	Tax Lot-Polk Co. 671 DC3800	Unknown
	Triangle Park-PC	671 DC2800 & 2900	Unknown
State and Federal Highways	Main Street	State Hwy 18B	
Railroads	Willamette Pacific		
Bridges	State owned		
Transportation Facilities	Transportation-related facilities		None

**Comment [AD19]:** Please update with any facilities new since 2009



**Jurisdictional Addenda  
City of Willamina**

**Table 7.8-7. City of Willamina Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Utilities	Water Treatment Facilities		\$2.34 M
	Telephone		owned by Embarq
	Wastewater Treatment Plant		\$4.8 mil
	Lift Station - YC		\$150,000
	Lift Station - YC		\$150,000
	Water Tank		included in water facilities
	Television		Unknown
	Landfill		Unknown
	Power Plant/Substations		Unknown

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

NA = Not Available.

**Comment [AD19]:** Please update with any facilities new since 2009

## Vulnerability Analysis

The vulnerability analysis development process is thoroughly discussed in the Yamhill County MHMP, Section 6, which generated the following Hazard Exposure Analysis Overviews. Tables 7.8-8, 7.8-9, and 7.8-10 depict in tabular form results obtained from the GIS analysis depicted in hazard figures located in Appendix A.

**Table 7.8-8. City of Willamina Potential Hazard Exposure Analysis Overview-Population and Buildings**

Hazard Type	Hazard Area	Methodology	Population Number	Buildings			
				Residential		Non-Residential	
				Number	Value (\$) <sup>1</sup>	Number	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	29	2,917,400	--	--
	High	100-year floodplain	--	17	1,710,200	--	--
Winter Storm		descriptive	1,885	730	74,387,000	1	unknown
Landslide	Moderate	14-32 degrees	--	318	31,990,800	1	unknown
	High	>32 degrees	--	114	11,468,400	1	unknown
Wildland Fire	Moderate	Moderate fuel rank	--	395	39,737,000	1	unknown
	High	High fuel rank	--	308	30,984,800	1	unknown
	Very High	Very high fuel rank	--	195	19,617,000	1	unknown
	Extreme	Extreme fuel rank	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1,885	730	74,387,000	1	unknown
	Very strong	>20-40% (g)	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--
Volcano		descriptive	1,885	730	74,387,000	1	unknown
Wind		descriptive	1,885	730	74,387,000	1	unknown
Erosion		descriptive	1,885	--	--	--	--
Drought		descriptive	--	--	--	--	--

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$100,600 per structure). <sup>2</sup> Dam inundation data is not available at this time.  
Note-population by parcel was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed.

Table 7.8-9. City of Willamina Potential Hazard Exposure Analysis Overview-Critical Facilities												
			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	--	--	1	850K	4	975K
	High	100-year floodplain	--	--	--	--	--	--	--	--	4	975K
Winter Storm		descriptive	6	1.5M	3	2.9M	7	19.3M	5	370K	8	975K
Landslide	Moderate	14-32 degrees	4	901K	2	2.9M	1	19.3M	3	370K	4	975K
	High	>32 degrees	--	--	--	--	--	--	--	--	2	unknown
Wildland Fire	Moderate	Moderate fuel rank	6	1.3M	2	2.9M	2	19.3M	3	370K	5	975K
	High	High fuel rank	4	901K	2	2.9M	1	19.3M	3	370K	7	975K
	Very High	Very high fuel rank	--	--	1	2.9M	--	--	1	110K	3	275K
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	6	1.5M	3	2.9M	7	19.3M	5	370K	8	975K
Wind		descriptive	6	1.5M	3	2.9M	7	19.3M	5	370K	8	975K
Erosion		descriptive	--	--	--	--	--	--	--	--	1	700K
Drought		descriptive	6	1.5M	3	2.9M	7	19.3M	5	370K	8	975K

1 ó values for all facilities may not be available.

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Table 7.8-10. City of Willamina Potential Hazard Exposure Analysis Overview-Critical Infrastructure														
			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	1	unknown	--	--	--	--	--	--
	High	100-year floodplain	--	--	--	--	1	unknown	--	--	--	--	--	--
Winter Storm		descriptive	1 unknown	unknown	1 unknown	unknown	1	unknown	--	--	9	7.44M	--	--
Landslide	Moderate	14-32 degrees	--	--	--	--	1	unknown	--	--	3	2.3M	--	--
	High	>32 degrees	--	--	--	--	1	unknown	--	--	--	--	--	--
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	1	unknown	--	--	5	11.9M	--	--
	High	High fuel rank	--	--	--	--	1	unknown	--	--	3	2.3M	--	--
	Very High	Very high fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Very strong	>20-40% (g)	--	--	--	--	--	--	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	--	--	--	--	--	--	--	--
Volcano		descriptive	1 unknown	unknown	1 unknown	unknown	1	unknown	--	--	9	7.44M	--	--
Wind		descriptive	1 unknown	unknown	1 unknown	unknown	1	unknown	--	--	9	7.44M	--	--
Erosion		descriptive	--	--	--	--	--	--	--	--	--	--	--	--
Drought		descriptive	1 unknown	unknown	1 unknown	unknown	1	unknown	--	--	9	7.44M	--	--

1 6 values for all facilities may not be available.

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## **SUMMARY OF VULNERABILITIES AND IMPACTS TO IDENTIFIED HAZARDS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards in addition to technological and manmade hazards identified in the 2009 Yamhill County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Willamina. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

In the City of Willamina, 17 residential structures (value \$1.7M), four community facilities (value \$975K), and one bridge (value unknown) is located within the boundaries of the 100-year floodplain and therefore accorded a high flood risk.

There are 29 residential structures (value \$2.9M), one care facility (value \$850K), four community facilities (value \$975K), and one bridge (value unknown) are located within the 500-year floodplain and accorded a moderate flood risk.

### ***Winter Storm***

Winter storms have widespread impacts that are most often the result of the ice, cold, high winds and flooding they bring. Damage to facilities and infrastructure can be severe, depending on the intensity of the storm event.

Since winter storms are regional events, the entire City of Willamina can be equally affected. This includes 1,885 residents, 730 residential structures (value \$74.4M), one non-residential structure (value unknown), six government facilities (value \$1.5M), three emergency response facilities (value \$2.9M), seven educational facilities (value \$19.3M), five care facilities (value \$370K), eight community facilities (value \$975K), nine utilities, one highway segment, one rail segment, and one bridge (values unknown) are at risk.

### ***Landslide***

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

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USGS elevation datasets were used to determine the landslide hazard areas within the City of Willamina. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Using these guidelines, the City of Willamina has 318 residential structures (value \$31.9M), one non-residential structure (value unknown), four government facilities (value \$901K), two emergency response facilities (value \$2.9M), three care facilities (value \$370K), one educational facility (value \$19.3M), four community facilities (value \$975K), one bridge (value unknown), and three utilities (value \$2.3M) located in areas of moderate risk.

There are 114 residential structures (value \$11.5M), one non-residential structure (value unknown), two community facilities (value unknown) and one bridge (value unknown) located within areas of high risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Willamina has critical facilities and infrastructure located within areas with moderate, high, and very high fuel rankings. Areas of moderate fuel rank contain 395 residential structures (value \$39.7M), one non-residential structures (value unknown), six government facilities (value \$1.3M), two emergency response facilities (value \$2.9M), three care facilities (value \$370K), two educational facilities (value \$19.3M), five community facilities (value \$975K), one bridge (value unknown), and five utilities (value \$11.9M).

Areas of high fuel rank contain 308 residential structures (value \$30.9M), one non-residential structure (value unknown), four government facilities (value \$901K), two emergency response facilities (value \$2.9M), three care facilities (value \$370K), one educational facility (value \$19.3M), seven community facilities (value \$975K), one bridge (value unknown), and three utilities (value \$2.3M).

Areas of very high fuel rank contain 195 residential structures (value \$19.6M), one non-residential structure (value unknown), one emergency response facility (value \$2.9M), one care facility (value \$110K), one educational facility (value \$19.3M), and three community facilities (value \$275K).

### ***Earthquake***

Based on PGA shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.



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The City of Willamina is in the eastern portion of Yamhill County, in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake, and for a strong designation corresponds to 9-20 percent of the acceleration of gravity.

The entire City of Willamina can be equally affected by earthquakes. This includes 1,885 residents, 730 residential structures (value \$74.4M), one non-residential structure (value unknown), six government facilities (value \$1.5M), three emergency response facilities (value \$2.9M), seven educational facilities (value \$19.3M), five care facilities (value \$370K), eight community facilities (value \$975K), nine utilities, one highway segment, one rail segment, and one bridge (values unknown) at risk to a strong shaking earthquake.

### ***Volcano***

As discussed in Chapter 5, volcanic activity is most likely to impact Yamhill County and the City of Willamina in the form of ashfall or tephra. Damage is likely to result from volcanic eruption columns and clouds which contain volcanic gases, minerals, and rock. The columns and clouds form rapidly and extend several miles above an eruption. Solid particles within the clouds present a serious aviation threat, and can distribute acid rain as sulfur dioxide gas mixes with water. Additionally, these particles can create a risk of suffocation as carbon dioxide is heavier than air and collects in valleys and depressions threatening human and animals. They further pose a toxic threat from fluorine which clings to ash particles potentially poisoning grazing livestock and contaminating domestic water supplies.

However, due to the nature of the hazard, it is impossible to predict the location or extent of future events with any probability, although it can be assumed that all 1,885 residents, 730 residential structures (value \$74.4M), one non-residential structure (value unknown), six government facilities (value \$1.5M), three emergency response facilities (value \$2.9M), seven educational facilities (value \$19.3M), five care facilities (value \$370K), eight community facilities (value \$975K), nine utilities, one highway segment, one rail segment, and one bridge (values unknown) are at risk.

### ***Wind***

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Willamina are equally at risk of a windstorm event. This includes 1,885 residents, 730 residential structures (value \$74.4M), one non-residential structure (value unknown), six government facilities (value \$1.5M), three emergency response facilities (value \$2.9M), seven educational facilities (value \$19.3M), five care facilities (value \$370K), eight community facilities (value \$975K), nine utilities, one highway segment, one rail segment, and one bridge (values unknown) are at risk.

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### ***Erosion***

Riverine erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure. Erosion hazard data is not readily available; however, descriptions of several localized areas were identified during the development of this document and are identified only by location on a map referencing the river or stream reach described. Critical facilities that may be at risk of erosion were identified using a 300 foot-buffer in the areas identified as having historic erosion impacts to conservatively account for building footprints.

One community facility (value \$700K) was identified in the City of Willamina to be at risk from erosion impacts.

### ***Drought***

State-wide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the City of Willamina's local economy such as agriculture, fishing, and timber have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

## **MITIGATION STRATEGY**

### **IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

#### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

##### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

**Source:** FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.8-11, or to revise them to more fully meet the City's needs. The City then proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 7.8-12 depicts the City's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.8-12 delineate those actions the city will strive to implement within this five year planning cycle.

#### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

##### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

##### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

**Source:** FEMA, March 2013.

The City of Willamina actively participates in FEMA's National Flood Insurance Program (NFIP) and have implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties. They subsequently selected and prioritized City appropriate actions to assure an effective flood mitigation program.

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**MITIGATION GOALS AND ACTION ITEMS CONSIDERED**

<b>Table 7.8-11. 2014 Yamhill County Mitigation Goals-Considered</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

<ul style="list-style-type: none"> <li>■ <b>DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions</b></li> </ul>	
<ul style="list-style-type: none"> <li>■ <b>Local Planning Updates and Revisions</b></li> </ul>	
<ul style="list-style-type: none"> <li>■ <b>Requirement §201.6(d)(3):</b> A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.</li> </ul>	
<ul style="list-style-type: none"> <li>■ <b>Element</b></li> </ul>	
<ul style="list-style-type: none"> <li>■ D1. Was the plan revised to reflect changes in development?</li> <li>■ D2. Was the plan revised to reflect progress in local mitigation efforts?</li> <li>■ D3. Was the plan revised to reflect changes in priorities?</li> </ul>	
<ul style="list-style-type: none"> <li>■ Source: FEMA, March 2013.</li> </ul>	

## Jurisdictional Addenda City of Willamina

**Table 7.8-12. City of Willamina Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH	<i>Ongoing</i>	o	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH	<i>Ongoing</i>	o	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH	<i>Ongoing</i>	o	Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH	Consider	o	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH	<i>Ongoing</i>	o	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH	Consider	u	Relocate power lines to underground to reduce power line failure during severe wind or winter ice storm events.
MH	<i>Ongoing</i>	n	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH	<i>Ongoing</i>	o	Install lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH	Consider	u	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
MH	<i>Ongoing</i>	o	Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.
MH	<i>Ongoing</i>	o	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
MH	Consider	u	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards.
MH	Consider	o	Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
MH	Consider	u	Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.
MH	Consider	o	Identify and pursue funding opportunities to implement mitigation actions.

**Comment [AD20]:** For status please choose one of the following:  
 •Completed  
 •On-Going  
 •Deferred  
 Delete

**Comment [AD21]:** For Deferred or Deleted action items please provide a rationale in the comment column (ie-Redundant with Comprehensive Plan, [Lack funding](#) and [staff availability](#), etc.)

**Jurisdictional Addenda  
City of Willamina**

**Table 7.8-12. City of Willamina Mitigation Actions Considered**

Hazard	Status	Comment	Description
MH	<i>Ongoing</i>	o	Develop public and private sector partnerships to foster hazard mitigation activities.
MH	Consider		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
<b>Flood</b>			
Flood	<i>Ongoing</i>	O	Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood	Consider	Cu	Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood	Consider	O	Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood	Consider	U	Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.
Flood	Consider	O	Request DOGAMI debris flow and lahar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.
Flood	<i>Ongoing</i>	O	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Flood	Consider	O	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood	<i>Ongoing</i>	O	Develop, implement, and enforce floodplain management ordinances.
Flood	Consider	U	Install new streamflow and rainfall measuring gauges.
Flood	<i>Ongoing</i>	O	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.
Flood	Consider	O	Increase culvert size to increase its drainage efficiency.
Flood	Consider	U	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
Flood	<i>Ongoing</i>	O	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow rate.
Flood	Consider	O	Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events. .
Flood	Consider	O	Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood	Consider	U	Develop and implement flood risk reduction program and outreach efforts considering upstream storage, channel improvements, and flood walls or levee construction.
<b>Winter Storm</b>			

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 •Completed  
 •On-Going  
 •Deferred  
 Delete

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## Jurisdictional Addenda City of Willamina

**Table 7.8-12. City of Willamina Mitigation Actions Considered**

Hazard	Status	Comment	Description
Winter Storm	<i>Ongoing</i>	O	Develop and implement strategies and educational outreach programs for debris management from severe winter storms.
Winter Storm	Consider	O	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm	Consider	O	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm	Consider		Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storm	<i>Ongoing</i>	O	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm	Consider	U	Purchase NOAA Weather radios and develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).
Winter Storm	Consider	U	Install new streamflow and precipitation measuring gauges and develop monitoring and early warning program.
Winter Storm	Consider	O	Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
Winter Storm	Consider	U	Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests. Develop Reverse Notification System with the county.
Winter Storm	<i>Ongoing</i>	O	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm	Consider	U	Relocate power lines to underground to reduce power line failure during severe wind or winter ice storm events.
<b>Wildland Fire</b>			
Wildland Fire	<i>Ongoing</i>	O	Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire	Consider	O	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire	<i>Ongoing</i>	O	Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire	<i>Ongoing</i>	O	Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire	<i>Ongoing</i>	O	Promote FireWise building siting, design, and construction materials.
Wildland Fire	<i>Ongoing</i>	O	Develop FireWise Public Service Announcements (PSA).
Wildland Fire	<i>Ongoing</i>	O	Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire	Consider	U	Conduct residential audits for wildland and building fire hazard identification then develop an outreach program to convey the findings.
Wildland Fire	<i>Ongoing</i>	O	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls

**Comment [AD20]:** For status please choose one of the following:

- Completed
- On-Going
- Deferred
- Delete

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## Jurisdictional Addenda City of Willamina

**Table 7.8-12. City of Willamina Mitigation Actions Considered**

Hazard	Status	Comment	Description
			outdoor burning.
Wildland Fire	Consider	O	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire	Consider	O	Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.
Wildland Fire	Consider	O	Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
<b>Earthquake</b>			
Earthquake	Consider	O	Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake	Consider	O	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake	<i>Ongoing</i>	O	Update existing (or adopt the most current) Uniform Building Code
Earthquake	<i>Ongoing</i>	O	Implement and enforce the Uniform, International, and State Building Codes.
Earthquake	<i>Ongoing</i>	O	Inspect and/or certify all new construction.
Earthquake	Consider	O	Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.
Earthquake	Consider	O	Develop outreach program to educate population concerning household, business, and public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.
Earthquake	<i>Ongoing</i>	O	Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake	Consider	O	Inspect and prioritize any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake	Consider	O	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, and electric power systems, within the jurisdiction.
Earthquake	<i>Ongoing</i>	O	Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake	<i>Ongoing</i>	O	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake	<i>Ongoing</i>	O	Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<b>Volcano</b>			
Volcano	<i>Ongoing</i>	O	Update public emergency notification procedures and develop an outreach program for ash fall events.
Volcano	<i>Ongoing</i>	O	Update emergency response planning and develop client focused outreach program for ash fall events affecting river, air, and highway transportation, and industrial facilities and operations.
Volcano	<i>Ongoing</i>	O	Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency

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- Deferred
- Delete

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**Jurisdictional Addenda  
City of Willamina**

**Table 7.8-12. City of Willamina Mitigation Actions Considered**

Hazard	Status	Comment	Description
			response plans, and upgrade treatment facilities physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.
Volcano	<i>Ongoing</i>	O	Evaluate ash impact on storm water drainage system and develop mitigation actions.
<b>Wind</b>			
Wind	<i>Ongoing</i>	O	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind	<i>Ongoing</i>	o	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind	Consider	U	Relocate power lines to underground to reduce power line failure during severe wind or winter ice storm events
<b>Erosion</b>			
Erosion	Consider	O	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
Erosion	Consider	O	Apply for grants/funds to implement riverbank protection methods.
Erosion	Consider	O	Develop and provide information to all residents on riverbank erosion and methods to prevent it in an easily distributed format
Erosion	Consider	O	Install riverbank erosion protection measures as needed and determined by a qualified engineer.
<b>Drought</b>			
Drought	Consider	U	Develop educational programs and initiatives related to water conservation and irrigation during drought periods.
<b>Dam Failure</b>			
Dam Failure	Consider	U	Prepare high resolution dam failure inundation area maps; use to update emergency response plans, evacuation route identification, public notification, and evacuation procedures
<b>Disruption of Utility and Transportation Systems (DUTS)</b>			
DUTS	Consider		Develop outreach program to educate and encourage residents to maintain several days of emergency supplies for power outages or road closures.
DUTS	Consider	O	Review and update emergency response plans for utility disruptions.
DUTS	Consider	O	Review and update emergency response plans for transportation route disruptions.
DUTS	Consider	O	Identify and prioritize all jurisdiction owned+ & non-jurisdiction owned+critical facilities that have backup power and emergency operations plans.
DUTS	Consider	N	Purchase backup power systems for all identified critical facilities.
<b>Hazardous Materials (HAZMAT)</b>			
HAZMAT	<i>Ongoing</i>	O	Annually review and update HAZMAT inventories and ensure that emergency responders are trained for site-specific incidents.

**Comment [AD20]:** For status please choose one of the following:  
 •Completed  
 •On-Going  
 •Deferred  
 Delete

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**Jurisdictional Addenda  
City of Willamina**

**Table 7.8-12. City of Willamina Mitigation Actions Considered**

Hazard	Status	Comment	Description
HAZMAT	<i>Ongoing</i>	O	Enhance emergency planning, emergency response training, and equipment acquisition to address hazardous materials incidents for emergency and first responders and public works staff.
HAZMAT	<i>Ongoing</i>	O	Evaluate existing security measures for sites with large quantities of hazardous substances (HS) or any quantities of extremely hazardous substances (EHS) and enhance security as necessary.
HAZMAT	<i>Ongoing</i>	O	Train Public Works staff to identify extremely hazardous substances (EHS) and to follow EMS protocols.
HAZMAT	Consider	O	Develop outreach program to educate the public regarding chemical hazards, safe handling, storage, and disposal procedures.
HAZMAT	<i>Ongoing</i>	O	Research, develop, and implement methods to protect waterways from hazardous materials events.
HAZMAT	<i>Ongoing</i>	o	Prepare a site-specific summary of hazardous materials used, stored, and commonly transported in the jurisdictional area. The summary should include mapped facility locations with a hazardous materials inventory, emergency response protocols, and mitigation actions.
<b>Terrorism</b>			
Terrorism	<i>Ongoing</i>	O	Enhance emergency planning, organization, equipment, exercise, and emergency response training to address all potential terrorism incidents.
Terrorism	Consider	O	Upgrade physical security, detection, and response capability for critical facilities using information obtained from hazard assessments and risk analysis. Include water systems and any high-profile facilities such as major timber industry facilities and sites with large quantities of hazardous substances (HS) and extremely hazardous substances (EHS).

**Comment [AD20]:** For status please choose one of the following:

- Completed
- On-Going
- Deferred
- Delete

**Comment [AD21]:** For Deferred or Deleted action items please provide a rationale in the comment column (ie-Redundant with Comprehensive Plan, [Lack funding and staff availability](#), etc.)

## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

#### **Implementation of Mitigation Actions**

**Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

**Source: FEMA, March 2013.**

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of the City of Willamina's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Willamina's highest priority mitigation actions.

## Jurisdictional Addenda City of Willamina

### MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED

The City of Willamina reviewed the Yamhill County goals, determined they meet the City's needs, and subsequently implemented the Goals in Table 7.8-13 for the current planning period.

**Table 7.8-13 City of Willamina Mitigation Goals**

Goal Number	Goal Description
1	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
5	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.
7	DEVELOPMENT <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
8	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

**Comment [AD22]:** Please update as needed to reflect the goals of the City

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**

#### **Identification of Multi-Jurisdictional Mitigation Actions**

**Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

#### **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

**Source:** FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding..

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section II and the Hazard Annexes.

---

***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

## **Jurisdictional Addenda City of Willamina**

Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### ***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

### ***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

### ***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

### ***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan's five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin on the particular action.

## Jurisdictional Addenda City of Willamina

<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Purchase and install generators for critical facilities		<i>Emergency operations preventive</i>	
<b>Alignment with Existing Plans/Policies:</b>			
<b>Rationale for Proposed Action Item:</b>			
<b>Ideas for Implementation:</b>			
ID all critical facilities			
<b>Coordinating Organization:</b>		City of Willamina	
<b>Internal Partners:</b>		<b>External Partners:</b>	
		School, Funding group	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
Homeland secure			Ongoing Immediate (1-3 years) <span style="background-color: yellow;">Long term (4+ years)</span>
<b>Form Submitted by:</b>			
<b>Action Item Status:</b>			



## **7.9 CITY OF YAMHILL**

This addendum contains specific City of Yamhill information to support the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan update.

This section supports the City of Yamhill's planning process by listing Steering Committee membership, documenting public outreach efforts, and summarizing the review and incorporation of existing plans, studies, and reports used to develop this MHMP.

### **COMMUNITY DESCRIPTION**

The City of Yamhill is located in the northwest Willamette Valley. The city's 2013 population was 1,030. (PSU 2014) The U.S. Census's 2012 American Community Survey reports that 7.1 percent of the population is under five years of age, 50.2 percent are between the ages of 18 and 64, and 11 percent of the population is 65 years or older. Of the City of Yamhill's 500 residents eligible for the labor force, 463 were employed, and the unemployment rate was 4.8 percent. The 2012 median household income was \$73,068 and the median family income was \$74,091. The City's per capita income in 2012 was \$21,312. Fourth and six-tenths percent of Yamhill's families were living below the poverty level in 2012. In that same year, 11.3 percent of individuals were also living below the poverty level. (U.S. Census 2006, 2012)

#### **DMA 2000 Requirements: Planning Process**

##### **Planning Process**

**Requirement §201.6(b)(2):** The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.

##### **Element**

- A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process?

##### **Documentation of the Planning Process**

**Requirement §201.6(b):** The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

##### **Element**

- A3. Does the Plan document how the public was involved in the planning process during the drafting stage?

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### DMA 2000 Requirements: Planning Process

**Requirement §201.6(c)(1):** The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

#### Element

- A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?

### Incorporation of Existing Plans

**Requirement §201.6(b)(3):** The planning process shall include the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

#### Element

- A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

Source: FEMA, March 2013.

The City of Yamhill is dedicated to mitigating potential natural and technological hazard threats to its population and infrastructure. To fulfill that goal, the City organized a Hazard Mitigation Plan development Steering Committee dedicated to identifying hazard threats and developing actions that can be taken to mitigate damage and life losses from those threats.

Table 7.9-1 contains the City's Steering Committee participant list to augment the Yamhill County MHMP planning elements.

Table 7.9-1. City of Yamhill Steering Committee	
Name	Agency/Department/Affiliation
Richard A. Howard Sr.	Public Works Superintendent
Paula Terp	Mayor
Jay Disbrow	City Councilor
Kay Echauri	City Councilor
Jo Weinstein	City Councilor
Lori Gilmore	City Recorder/Treasurer

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Table 7.9-2 contains the summary of the City's public involvement and planning meeting activities.

<b>Table 7.9-2. City of Yamhill Public Involvement Mechanisms</b>	
<b>Mechanism</b>	<b>Description</b>
April 2014 Kickoff Newsletter	Explained plan development process and solicited input and comments.
February 26, 2014 Countywide Public Meeting, 10 a.m., 2 p.m., Yamhill County Public Works Auditorium, McMinnville, OR	HPM Kick-off meeting and discussion.
May 21, 2014 Countywide Public Meeting, 9:am Yamhill County Public Works Auditorium, McMinnville, OR	Presented risk assessment results and provided opportunity to comment.
Committee Meeting, April 18, 2014 & May 14, 2014 Council Meeting.	Discussed the Addendum Draft, selected and prioritized mitigation actions to implement

## CAPABILITY ASSESSMENT

Table 7.9-3, 7.9-4, and 7.9-5 contain the City's resources used to support planning activities

<b>Table 7.9-3. City of Yamhill Legal and Regulatory Resources Available for Hazard Mitigation</b>		
<b>Regulatory Tool</b>	<b>Name</b>	<b>Effect on Hazard Mitigation</b>
Plans	Comprehensive Plan	To guide governance and regulate land-use and development within the City
	Transportation Plan	To guide and ensure transportation infrastructure development complies with City requirements.
	City Charter	To provide for the government of City of Yamhill, Yamhill County, Oregon; and to repeal all charter provisions of the city enacted prior to the time that this charter takes effect.
	City Emergency Operations Plan	Emergency management to ensure the City is prepared for a Disaster.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Codes)	Title 7 Emergency Organization and Functions	Provides for the preparation and carrying out of plans for the protection of persons and property within the County in the event of an emergency. Describes known hazards
	Title 8.70 Hazardous Materials Releases	Provides procedure for coordination among various agencies in the event of hazardous materials releases. Describes known hazards

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**Table 7.9-3. City of Yamhill Legal and Regulatory Resources Available for Hazard Mitigation**

Regulatory Tool	Name	Effect on Hazard Mitigation
Policies (Municipal Codes)	2010 Municipal Code Chapter 10.04	<p>In order to designate and regulate the size and use of structures and lands within the City of Yamhill, the City is hereby divided into five zones as follows:</p> <ul style="list-style-type: none"> <li>• (A) R-1 Single-family Residential</li> <li>• (B) R-2 Single-family Residential</li> <li>• (C) R-3 Two family Residential</li> <li>• (D) RLC Residential Limited Commercial</li> <li>• (E) C-3 General Commercial Zone</li> </ul> <p>The City shall also contain three Overlay zones as follows:</p> <ul style="list-style-type: none"> <li>• (A) PFO Public Facilities Overlay Zone</li> <li>• (B) FHO Flood Hazard Overlay Zone</li> <li>• (C) LUO Limited Use Overlay Zone</li> </ul>
	Municipal Code Chap 10.40 FHO Flood Hazard Overlay Zone	<p>To regulate and prohibit some uses in those areas in the Flood Hazard Overlay Zone that would endanger the safety and general welfare of the community.</p> <p>A Flood Hazard Overlay Zone shall be considered as an overlay to any existing zone and the development of said property shall be in accordance with this zone's requirements for USE, except as may be specifically allowed by the Planning Commission under the provisions of this Section.</p> <p>A Flood Hazard Overlay Zone shall be identified on the ZONING MAP in addition to the existing zone. (Ord. 384, §2(part), 1988; Ord. 420, §3, 1997; Ord. 454, §2, 2000 Ord. 488 1,2010)</p>
	Municipal Code Chap 10.92 Land Use and Building Permit Procedure	<p>No building, structure, or premises shall hereafter be used or occupied, and no building or structure or part thereof shall hereafter be erected, constructed, moved, structurally altered, or enlarged unless in conformity with all the regulations herein specified for the zone in which it is located, and then only after applying for and securing all permits and licenses required by all laws and regulations. (Ord. 350, §8.1, 1984; Ord. 420, §3, 1997; Ord. 454, §2, 2000)</p>

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City of Yamhill**

**Table 7.9-4. City of Yamhill Administrative and Technical Resources for Hazard Mitigation**

<b>Staff/Personnel Resources</b>	<b>Department/Division Position</b>
Planner(s) or engineer(s) with knowledge of land development and land management practices	Engineer: AKS Engineering Planner: John Morgan
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Engineer: AKS Engineering
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planner: John Morgan
Floodplain manager	Richard Howard or John Morgan
Personnel skilled in GIS and/or HAZUS-MH	Engineer: AKS Engineering Planner: John Morgan
Director of Emergency Services	Name: Chief Greg Graven
Finance (grant writers, purchasing)	Name/position: Department Heads
Public Information Officers	Name: Mayor Paul Terp

**Table 7.9-5. City of Yamhill Financial Resources for Hazard Mitigation**

<b>Financial Resources</b>	<b>Effect on Hazard Mitigation</b>
General funds	Yes
Authority to levy taxes for specific purposes	Yes-with voter approval
Incur debt through general obligation bonds	Yes-with voter approval
Incur debt through special tax and revenue bonds	Yes-with voter approval
Incur debt through private activity bonds	Yes-with voter approval
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.

## HAZARD IDENTIFICATION AND SCREENING

The following section defines hazard identification as stipulated in DMA 2000 and its implementing regulations.

### DMA 2000 Requirements: Risk Assessment: Identifying Hazards

#### Identifying Hazards

**Requirement §201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

The City of Yamhill's Steering Committee determined that the following hazards could potentially threaten the community. Those identified with an (X) are specific to the City of Yamhill.

<i><b>Natural Hazards</b></i>	
Flood	X
Winter Storm	X
Landslide	X
Fire (Wildland/Urban)	X
Earthquake	X
Volcano	
Wind	X
Erosion	
Drought	X

## **OVERVIEW OF VULNERABILITY ANALYSIS**

This section summarizes community specific vulnerability information for City of Yamhill to augment the MHMP development process. It comprises:

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.
- Assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

The following defines vulnerability analysis as stipulated in DMA 2000 and its implementing regulations.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview**

#### **Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** The risk assessment shall include an overall summary of each hazard and its impact on the community.

#### **Element**

- B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?

Source: FEMA, March 2013.

### **DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties**

#### **Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** All plans must address NFIP insured structures that have been repetitively damaged by floods.

#### **Element**

- B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2013.

The City of Yamhill actively participates in FEMA's National Flood Insurance Program (NFIP) and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties to assure an effective flood mitigation program.



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### DMA 2000 Recommendations: Multi-Jurisdictional Risk Assessment

#### Assessing Vulnerability: Multi-Jurisdictional Risk Assessment

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

#### Element

- B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?
- B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?

Source: FEMA, March 2013.

## VULNERABILITY ANALYSIS

### Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within the City that may be affected by hazard events include population, residential and nonresidential buildings, critical facilities, and infrastructure.

The asset inventory delineates the City's existing building and infrastructure assets and insured values and are identified in detail in Tables 7.9-6A, 7.9-6B, and 7.9-7. Tables 7.9-8, 7.9-9, and 7.9-10 portray the critical infrastructure numbers and values, and their potential vulnerability by hazard type. Because of time and budget constraints the values identified using HAZUS in these tables have not been updated since the 2009 MHMP update. Where information was readily available, updates have been made. For this 2014 MHMP update members of the countywide steering committee identified the most critical assets in vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of existing and new mitigation actions.

The City of Yamhill seeks to protect its population by supporting Yamhill County and Oregon State initiatives, ordinances, building codes, and development regulations. One of the most important initiatives is to prohibit or not allow future development of buildings, infrastructure and critical facilities in identified high hazard areas. Any essential infrastructure component will undergo stringent review to ensure potential hazard risk will be mitigated.

### Population and Building Stock

Population data listed in Table 7.9-6A were obtained from the 2000 U.S. Census and Portland State University. It comprises census block level data, and estimates from university conducted community research.

The City's existing building and infrastructure and insured values are identified in Tables 7.9-6A, 7.9-6B, and 7.9-7.

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<b>Table 7.9-6A. City of Yamhill Estimated Population and Building Inventory</b>				
<b>Population</b>			<b>Residential Buildings</b>	
<b>2000 Census</b>	<b>Estimated 2005 Census</b>	<b>Estimated 2013 Census<sup>2</sup></b>	<b>Total Building Count</b>	<b>Total Value of Buildings<sup>3</sup> (\$)</b>
794	820	1,030	374	62,114,136

**Source:** FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$125,200 per structure).

<sup>2</sup> Portland State University (PSU) 2014 Oregon Population Report.

<sup>3</sup> Yamhill county Taxing Districts: [http://www.co.yamhill.or.us/assessor/Documents/2013\\_Taxing\\_Districts.pdf](http://www.co.yamhill.or.us/assessor/Documents/2013_Taxing_Districts.pdf)

<b>Table 7.9-6B. City of Yamhill NFIP Insurance Report</b>								
<b>City</b>	<b>Total Premiums (\$)</b>	<b>Policies A-Zone</b>	<b>Total Policies</b>	<b>Total Coverage (\$)</b>	<b>Average Premium (\$)</b>	<b>Total Claims Since 1978</b>	<b>Total Paid Since 1978 (\$)</b>	<b>Rep Loss Properties<sup>2</sup></b>
Yamhill	1,888	1	4	996,600	472.00	1	7,280 <sub>3</sub>	0

**Source:** FEMA NFIP Insurance Report June 23, 2008

FEMA SQANet.

<sup>2</sup>Content and building claims.

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(Note . many critical facilities and locations have been identified and included in this inventory and risk assessment . due to their confidential nature, locations have been %shaded+for publication. The data will remain in the report for the County's future mitigation planning efforts)

**Table 7.9-7. City of Yamhill Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
Government	City Hall And Police Department with Community Center	205 S. Maple St.	\$942,450
	Public Works Offices and Wastewater Lab	450 S Maple St.	\$272,969
	Public Works Shops	450 S. Maple St.	\$148,455
Emergency Response	Fire Station & Emergency Operations Center	275 S. Olive St.	\$1,900,000.
	Fire Trucks		\$860,000
	Yamhill/Carlton Campus	275 N. Maple St. & 310 E Main St	\$43,278,103.
	(Other school assets) The School will have this list		\$2,137,409
Community	Beulah Park	W. 3rd and Maple St.	\$401,700
	Church of Jesus Christ of the Latter Day Saints	7200 NW Pike Rd.	Unknown
	Yamhill United Methodist Church	195 S. Laurel St.	Unknown
	Yamhill Christian Church	265 W. Main St.	\$422,422
	St. John's Catholic Church	445 N. Maple St.	Unknown
State and Federal Highways	Highway 47	ODOT	1 mile of hwy
	Highway 240		1 mile of hwy
Bridges	Bridge 1 (3 State Bridges on 3 sides of town)		Unknown
	Bridge 2		Unknown
	Bridges 3		Unknown
	1 County bridge on the west side of town		Unknown
Utilities	Wastewater Treatment Plant with four sewage lagoons		\$2,838,260
	Flag Pole/Clock, Chlorine Bldg, Pump House, Headworks & Generator/ equip.		\$450,289
	Water Treatment Plant		\$4,460,250
	Lift Station		\$165,830
	Water Tank (2 @ 500K Gallons each)		\$1,256,505
	Frontier Phone Switch Behind City Hall		Unknown
Dams	Intake Structure @ water plant		\$750,000

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**Table 7.9-7. City of Yamhill Critical Facilities and Infrastructure**

Facility Type	Name / Number	Address	Value <sup>1</sup>
	Impound		\$750,000

**Sources:**

FEMA HAZUS-MH, local jurisdictions.

<sup>1</sup>Estimated and/or insured structural value for critical facilities and estimated values for critical infrastructure.

## Vulnerability Analysis

The vulnerability analysis development process is thoroughly discussed in the Yamhill County MHMP, Section 6, which generated the following Hazard Exposure Analysis Overviews. Tables 7.9-8, 7.9-9, and 7.9-10 depict in tabular form results obtained from the GIS analysis depicted in hazard figures located in Appendix A.

<b>Table 7.9-8. City of Yamhill Potential Hazard Exposure Analysis Overview-Population and Buildings</b>							
			<b>Population Number</b>	<b>Buildings</b>			
<b>Hazard Type</b>	<b>Hazard Area</b>	<b>Methodology</b>		<b>Residential</b>		<b>Non-Residential</b>	
				<b>Number</b>	<b>Value (\$)<sup>1</sup></b>	<b>Number</b>	<b>Value (\$)<sup>1</sup></b>
Flood	Moderate	500-year floodplain	--	28	3,505,200	0	--
	High	100-year floodplain	--	38	4,757,600	0	--
Winter Storm		descriptive	1,030	374	62,114,136	13	1,627,600
Landslide	Moderate	14-32 degrees	--	18	2,253,600	0	--
	High	>32 degrees	--	--	--	0	--
Wildland Fire	Moderate	Moderate fuel rank	--	276	34,555,200	13	1,627,600
	High	High fuel rank	--	85	10,642,000	0	--
	Very High	Very high fuel rank	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--
Earthquake	Strong	9-20% (g)	1,030	374	62,114,136	13	1,627,600
	Very strong	>20-40% (g)	1,030	--	--	13	1,627,600
	Severe	>40-60% (g)	1,030	--	--	13	1,627,600
Wind		descriptive	1,030	374	62,114,136	13	1,627,600
Drought		descriptive	1,030	--	62,114,136	13	1,627,600

<sup>1</sup> Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is \$125,200 per structure) Note-population by parcel was not available at the time this document was prepared. Once this data is available, a useful analysis of population and residential structures by hazard can easily be completed.

Table 7.9-9. City of Yamhill Potential Hazard Exposure Analysis Overview-Critical Facilities												
			Government		Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	19	10.2M	--	--	--	--	--	--	1	422K
	High	100-year floodplain	16	6.3M	--	--	--	--	--	--	0	
Winter Storm		Descriptive	19	10.2M	2	2.6M	24	43.27M	--	--	10	4.1M
Landslide	Moderate	>14-32 degrees	5	4.8 M	0	0	0	0	--	--	0	0
	High	>32 degrees	0	--	--	--	0	0	--	--	0	0
Wildland Fire	Moderate	Moderate fuel rank	17	7.4M	2	2.6M	24	43.27M	--	--	4	3.2M
	High	High fuel rank	5	4.8M	--	--	0	0	--	--	6	883K
	Very High	Very high fuel rank	5	4.8M	--	--	--	--	--	--	0	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	20	12.3M	2	2.6M	24	43.27M	--	--	10	4.1M
	Very strong	>20-40% (g)	20	12.3M	2	2.6M	24	43.27M	--	--	10	4.1M
	Severe	>40-60% (g)	20	12.3M	2	2.6 M	24	43.27M	--	--	10	4.1M
Wind		Descriptive	20	12.3M	2	2.6M	24	43.27 M	--	--	10	4.1M
Drought		Descriptive	--	--	1	1.9M	--	--	--	--	--	--

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Table 7.9-10. City of Yamhill Potential Hazard Exposure Analysis Overview-Critical Infrastructure														
			Highways		Railroads		Bridges		Transportation Facilities		Utilities		Dams	
Hazard Type	Hazard Area	Methodology	Miles	Value (\$) <sup>1</sup>	Miles	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>	No.	Value (\$) <sup>1</sup>
Flood	Moderate	500-year floodplain	--	--	--	--	2	unknown	--	--	4	3.7M	--	--
	High	100-year floodplain	--	--	--	--	3	unknown	--	--	4	3.7M	--	--
Winter Storm		descriptive	2	unknown	--	--	4	unknown	--	--	8	9.4M	2	1.5M
Landslide	Moderate	>14-32 degrees	--	--	--	--	1	unknown	--	--	7	9.4M	2	1.5M
	High	>32 degrees	--	--	--	--	0	unknown	--	--	1	1.3M		
Wildland Fire	Moderate	Moderate fuel rank	--	--	--	--	2	unknown	--	--	8	9.4M	2	1.5M
	High	High fuel rank	--	--	--	--		unknown	--	--	8	9.4M	2	1.5M
	Very High	Very high fuel rank	--	--	--	--	0	unknown	--	--	2	5.7M	2	1.5M
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--	--	--	--	--
Earthquake	Strong	9-20% (g)	2	unknown	--	--	4	unknown	--	--	8	9.4M	2	1.5M
	Very strong	>20-40% (g)	--	--	--	--	4	unknown	--	--	--	--	--	--
	Severe	>40-60% (g)	--	--	--	--	4	unknown	--	--	--	--	--	--
Wind		descriptive	2	unknown	--	--	4	unknown	--	--	8	9.4M	2	1.5M
Drought		descriptive	2	unknown	--	--	4	unknown	--	--	8	9.4M	2	1.5M



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## **SUMMARY OF VULNERABILITIES AND IMPACTS TO HAZARD AREAS**

The following section describes each hazard and the community's vulnerabilities and impacts from natural hazards in addition to technological and manmade hazards identified in the 2009 Yamhill County MHMP.

The following is derived from the best available data for facility locations and values. In many cases, values were unavailable, and therefore the totals listed below should be considered incomplete and likely less than the actual costs associated with the respective hazards.

### ***Flood***

FEMA FIRMs were used to outline the 100-year and 500-year floodplains for the City of Yamhill. The 100-year floodplain delineates an area of high risk, while the 500-year floodplain delineates an area of moderate risk.

In the City of Yamhill, 38 residential structures (value \$4.8M), 16 government facilities (value \$6.3M), three bridges (value unknown), and four utilities (value \$3.7M) are located within the boundaries of the 100-year floodplain and therefore accorded a high risk.

The 500-year floodplain contains 28 residential structures (value \$3.5M), 19 government facilities (value \$10.2M), one community facility (value \$422K), two bridges (value unknown), and four utilities (value \$3.7M), which are assigned a moderate risk.

### ***Winter Storm***

Winter storms have widespread impacts that are most often the result of the ice, cold, high winds and flooding they bring. Damage to facilities and infrastructure can be severe, depending on the intensity of the storm event.

Since winter storms are regional events, all of the City of Yamhill can be equally affected. Therefore 1,030 residents, 374 residential structures (value \$62.1M), 13 non-residential structure (\$1.6M), 19 government facilities (value \$10.2M), two emergency response facilities (value \$2.6M), 24 educational facilities (value \$43.3M), ten community facilities (value \$4.1M), two highway segments (value unknown), four bridges (value unknown), eight utilities (value \$9.4M), and two dams (value \$1.5M) are at risk.

### ***Landslide***

The potential impacts from landslides can be widespread. Potential debris flows and landslides can impact transportation and rail routes, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and waste water utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

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USGS elevation datasets were used to determine the landslide hazard areas within the City of Yamhill. Risk was assigned based on slope angle. A slope angle less than 14 degrees was assigned a low risk, a slope angle between 14 and 32 degrees was assigned a medium risk, and a slope angle greater than 32 degrees was assigned a high risk.

Using these guidelines, the City of Yamhill has 18 residential structures (value \$2.3), five government facilities (value \$4.8M), one bridge (value unknown), seven utilities (value \$9.4M), and two dams (value \$1.5M) located in areas of moderate risk.

One utility (value \$1.3M) are located in an area of high risk.

### ***Wildland Fires***

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel values. Fuel ranks of moderate, high, very high, and extreme were assigned to the entire region based on the results of this modeling.

The City of Yamhill has critical facilities and infrastructure located within areas with moderate, high, and very high fuel ranks. Moderate fuel rank areas contain 276 residential structures (value \$34.6M), 13 non-residential structure (\$1.6M), 17 government facilities (value \$7.4M), two emergency response facility (value \$2.6M), 24 educational facilities (value \$43.3), four community facilities (value \$3.2M), two bridges (value unknown), eight utilities (value \$9.4M), and two dams (value \$1.5M).

High fuel rank areas contain 85 residential structures (value \$10.6M), five government facilities (value \$4.8M), six community facilities (value \$883K), eight utilities (value \$9.4M), and two dams (value \$1.5M).

Very high fuel rank areas contain five government facilities (value \$4.8M), two utilities (value \$5.7M) and two dams (value \$1.5M).

### ***Earthquake***

Based on PGA shake maps produced by the USGS, the western portion of Yamhill County is likely to experience higher levels of shaking than the eastern portion, as a result of its proximity to the Cascadia Subduction Zone. Ground movement in both areas, however, is likely to cause damage to weak, unreinforced masonry buildings, and to induce small landslides along unstable slopes. As well as landslide, earthquakes can trigger other hazards such as dam failure and disruption of transportation and utility systems.

The City of Yamhill is in the eastern portion of Yamhill County, in a region likely to experience strong shaking should a subduction zone earthquake occur. In contrast, the western portion of the county is likely to experience very strong shaking. This rating represents the peak acceleration of the ground caused by the earthquake, and for a strong designation corresponds to 9-20 percent of the acceleration of gravity.

Earthquakes can equally affect the entire City of Yamhill. Therefore 1,030 residents, 374 residential structures (value \$62.1), 13 non-residential structure (\$1.6M), twenty government facilities (value \$12.3M), two emergency response facilities (value \$2.6M), 24 educational

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facilities (value \$43.3M), ten community facilities (value \$4.1M), two highway segments (value unknown), four bridges (value unknown), eight utilities (value \$9.4M), and two dams (value \$1.5M) are at risk.

### *Wind*

Many buildings, utilities and transportation systems in open areas, natural grasslands, or agricultural lands are especially vulnerable to wind damage. Impacts associated with wind can include damage to power lines, trees, and structures, and can also cause temporary disruptions of power. Additionally, high winds can cause significant damage to forestlands.

All areas within the City of Yamhill are equally at risk of a windstorm event. Therefore 1,030 residents, 374 residential structures (value \$62.1), 13 non-residential structure (\$1.6M), twenty government facilities (value \$12.3M), two emergency response facilities (value \$2.6M), 24 educational facilities (value \$43.3M), ten community facilities (value \$4.1M), two highway segments (value unknown), four bridges (value unknown), eight utilities (value \$9.4M), and two dams (value \$1.5M) are at risk.

### *Drought*

Statewide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to the City of Yamhill's local economy such as agriculture, fishing, and timber have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

## IDENTIFYING MITIGATION ACTIONS

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

### DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions

#### Identification and Analysis of Mitigation Actions

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

#### Element

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.9-11, or to revise them to more fully meet the City's needs. The City then proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Table 7.9-12 depicts the City's "considered" mitigation actions developed during this

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mitigation planning process. The revised list in Table 7.9-14 delineates those actions the City will strive to implement within this five year planning cycle.

### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

#### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

#### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City of Yamhill actively participates in FEMA's National Flood Insurance Program (NFIP) and have implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City's Mitigation Strategy identified and analyzed potential flood mitigation actions that would fulfill NFIP initiatives, specifically addressing repetitive loss (RL) properties. They subsequently selected and prioritized City appropriate actions to assure an effective flood mitigation program.

## **MITIGATION STRATEGY**

### **IDENTIFYING MITIGATION ACTIONS**

The following section defines mitigation action identification and analysis as stipulated in DMA 2000 and its implementing regulations.

#### **DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions**

##### **Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

##### **Element**

- C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?

Source: FEMA, March 2013.

The Steering Committee assessed whether to adopt Yamhill County's mitigation goals listed in Table 7.9-11, or to revise them to more fully meet the city's needs. The committee proceeded to evaluate potential mitigation actions after finalizing the mitigation goals.

Mitigation actions are activities, measures, or projects used to achieve the goals of a mitigation plan. Table 7.9-12 depicts the city's considered mitigation actions developed during this mitigation planning process. The Action Item worksheets following Table 7.9-12 delineate those actions the city will strive to implement within this five year planning cycle.

#### **DMA 2000 Requirements: Mitigation Strategy - National Flood Insurance Program (NFIP) Compliance**

##### **National Flood Insurance Program (NFIP) Compliance**

**Requirement §201.6(c)(3)(ii):** The mitigation strategy shall address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate.

##### **Element**

- C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?

Source: FEMA, March 2013.

The City of Yamhill actively participates in FEMA's NFIP and has implemented floodplain policies, regulations, and ordinances to protect their threatened population and infrastructure to assure NFIP compliance.

The City of Yamhill's Mitigation Strategy identified and analyzed potential flood mitigation actions to fulfill NFIP initiatives, specifically addressing RL properties. They subsequently selected and prioritized city appropriate actions to assure an effective flood mitigation program.

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**MITIGATION GOALS AND ACTION ITEMS CONSIDERED**

<b>Table 7.9-11. 2014 Yamhill County Mitigation Goals-Considered</b>	
<b>Goal Number</b>	<b>Goal Description</b>
<b>1</b>	<b>EMERGENCY OPERATIONS</b> <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
<b>2</b>	<b>EDUCATION AND OUTREACH</b> <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
<b>3</b>	<b>PARTNERSHIPS</b> <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the City, County and other local jurisdictions to create more cohesive and effective hazard mitigation efforts.
<b>4</b>	<b>PREVENTIVE</b> <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i> Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.
<b>5</b>	<b>NATURAL RESOURCES UTILIZATION</b> <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
<b>6</b>	<b>IMPLEMENTATION</b> <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies the City of Yamhill
<b>7</b>	<b>DEVELOPMENT</b> <i>Goal Statement:</i> Communities appropriately apply development standards that consider the potential impacts of natural hazards.
<b>8</b>	<b>DOCUMENTATION</b> <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

**DMA 2000 Requirements: Mitigation Strategy – Local Planning Updates and Revisions**

**Local Planning Updates and Revisions**

**Requirement §201.6(d)(3):** A local jurisdiction must review and revise its plan to reflect progress in local mitigation efforts.

**Element**

- D1. Was the plan revised to reflect changes in development?
- D2. Was the plan revised to reflect progress in local mitigation efforts?
- D3. Was the plan revised to reflect changes in priorities?

Source: FEMA, March 2013.

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

Hazard	Status	Comment	Description
<b>Natural Hazards</b>			
<b>Multi-Hazard (MH)</b>			
MH23	New		Coordinate installation of main power transfer switches
MH1	Completed	completed	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.
MH2	Ongoing		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)
MH3	Ongoing		Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.
MH4	Ongoing		Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
MH5	Ongoing		Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
MH6	Deferred	Not in City's jurisdiction	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.
MH7	Ongoing		Coordinate installation of main power transfer switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. gas station, shelters, food storage and service facilities, medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)
MH8	Delete	Lack of Funding	Install lightening rods and lightening grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.
MH9	Delete	Will not develop, produce	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards. Use federal, state and county materials to maximum extent possible.
MH10	Ongoing		Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use. Include this in the upcoming comprehensive zoning review.
MH11	Deferred	Lack of funds	Based on known high-risk hazard areas, identify hazard-specific signage needs and purchase and install hazard warning signs near these areas to notify and educate the public of potential hazards. Bridges .what else????
MH12	Ongoing		Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened



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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

Hazard	Status	Comment	Description
			population.
MH13	Delete	Lack of funding	Install storm shutters, hurricane clips, bracing systems etc. to meet or exceed applicable building codes while reducing disaster damages. Part of building codes.
MH14	Delete	Lack of Funding	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project. Beyond the scope of the city's needs. No funding.
MH15	Delete	Lack of Funding	Develop vegetation projects to restore clear cut and riverine erosion damage and to increase landslide susceptible slope stability.
MH16	Delete	Lack of Funding	Retrofit structures to protect them from seismic, floods, high winds, earthquakes, or other natural hazards. Too expensive no funding.
MH17	Ongoing		Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas. Need to ID hazard-specific areas.
MH18	Delete		Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages. No such facilities.
MH19	Deferred		Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions. Good idea, but who?
MH20	Ongoing		Identify and pursue funding opportunities to implement mitigation actions.
MH21	Ongoing		Develop public and private sector partnerships to foster hazard mitigation activities.
MH22	Ongoing		Integrate the Mitigation Plan findings into planning and regulatory documents and programs and into enhanced emergency planning.
<b>Flood</b>			
Flood39	Ongoing		Clean flood prone waterways
Flood1	Ongoing		Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
Flood2	Ongoing		Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
Flood3	Ongoing		Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
Flood4	Ongoing		Develop and implement mitigation actions for repetitive loss properties.
Flood5	Ongoing		Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
Flood6	Ongoing		Implement mitigation measures identified by critical facilities' owners, and other facility owners, to protect facilities located within the 100-year floodplain.
Flood7	Ongoing		Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data. And our local situational information.

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Flood8	Deferred	Lack of staff	Request DOGAMI debris flow and lahar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.
Flood9	Delete	Redundant	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Flood10	Ongoing		Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
Flood11	Completed		Develop, implement, and enforce floodplain management ordinances.
Flood12	Delete	Lack of staff	Develop outreach program to educate residents concerning flood proofed well and sewer/septic installation. No requirements.
Flood13	Delete	Lack of Funding	Acquire, relocate, elevate, or otherwise flood-proof identified properties. Too Expensive
Flood14	Delete	Lack of Funding	Acquire, relocate, elevate, or otherwise flood-proof critical facilities. Too Expensive
Flood15	Delete	Lack of Funding	Install new streamflow and rainfall measuring gauges. State or County requirement
Flood16	Ongoing		Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins. Check status, should be part of existing building codes.
Flood17	Delete	Funding	Dry flood proof non-residential structures. No funding
Flood18	Delete	Funding	Dry flood proof historic structures. No funding
Flood19	Delete	State or county responsibility	Construct earthen berms to divert flood flows into bridge or culvert openings. The earth fill should be erosion-resistant and the berms should be covered with erosion-resistant fabric, armoring materials, or vegetation. State and County responsibility.
Flood20	Ongoing		Increase culvert size to increase its drainage efficiency. Need to ID culverts.
Flood21	Delete	Do not have basins	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging. State or County
Flood22	Delete	Lack of Funding	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris. Culverts only
Flood23	Delete	Lack of Funding	Construct debris deflectors to deflect the major portion of debris away from culvert entrances and bridge piers. They are normally "V" shaped. Culverts only, if required.
Flood24	Delete	Lack of Funding	Install debris fins upstream of a culvert to align debris so that the debris will pass through a drainage opening without clogging the inlet. They are sometimes used on bridge piers to deflect drifting materials. State requirement.
Flood25	Delete	Lack of Funding	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings. Water ultimately returning to its watercourse at a reduced flow

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

Hazard	Status	Comment	Description
			rate.
Flood26	Delete	Lack of Funding	Construct an emergency spillway at a dam or other structure to relieve excess water contained during high flow periods to reduce dam failure potential. Impound???
Flood27	Delete	Lack of Funding	Construct floodwalls around the perimeter of a "facility" and extending above the highest flood elevation to keep floodwaters away from the facility. Floodwalls can be made from gabion baskets, concrete, large riprap, etc. Floodwalls should be used with caution as they can also act as a catchment preventing drainage away from the facility. No requirement.
Flood28	Delete	Lack of Funding	Install triangular or circular flow deflectors on or immediately upstream from bridge footings to deflect water flow and reduce flow velocities preventing footing scour.
Flood29	Delete	Lack of Funding	Construct low water crossings in a road prism to carry flood flows from an intermittent drainage
Flood30	Delete	Lack of Funding	Construct a high water overflow crossing to carry flood flows from over bank areas.
Flood31	Delete	Lack of Funding	Realign bridge piers & abutments to be parallel with the stream's centerline. This prevents pier and abutment undermining and reduces debris catchment.
Flood32	Delete	Lack of Funding	Create relief drainage ditch opening using a culvert, bridge, or multiple culverts; to relieve rapid water accumulation during high water flow events. .
Flood33	Delete	Lack of Funding	Raise bridge height or convert bridge from a multi-span to single span to increase water flow and reduce debris catchment.
Flood34	Delete	Lack of Funding	Modify existing culverts by developing a ring compression, by flattening, or beveling the end of a circular culvert to match the angle of the embankment. May need to install flanges to stiffen the beveled section of the culvert.
Flood35	Delete	Lack of Funding	Construct spur dikes along the embankments to direct flood flows into a bridge opening or away from a continuous impact site.
Flood36	Delete	Don't have	Construct concrete wing walls at culvert or bridge entrances and outlets to direct water flow into their openings
Flood37	Delete	Lack of Funding	Provide flood protection to mitigate damage and contamination of wastewater treatment systems.
Flood38	Delete	Lack of Funding	Develop and implement flood risk reduction program and outreach efforts considering upstream storage, channel improvements, and flood walls or levee construction.
<b>Winter Storm</b>			
Winter Storm16	New		Develop snow removal plan
Winter Storm1	Delete	Lack of Funding	Develop and implement strategies and educational outreach programs for debris management from severe winter storms. Winter storms are few and far between, not enough to setup and administer a program.

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Winter Storm2	Delete	Lack of staff	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Winter Storm3	Delete	Lack of staff	Update or develop, implement, and maintain jurisdictional debris management plans. Not enough person power.
Winter Storm4	Ongoing		Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.
Winter Storm5	Delete	Lack of funding	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting of special needs populations.
Winter Storm6	Ongoing		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Winter Storm7	Ongoing		Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
Winter Storm8	Delete	Lack of funding	Develop personal use and educational outreach training for a safe tree harvesting program. Implement along utility and road corridors, preventing potential winter storm damage. PGE clears utility line corridors Public works monitors the streets. Not enough tree harvesting to warrant a program.
Winter Storm9	Ongoing		develop a web portal linking residents to various weather information sites. (NWS, FEMA, The Weather Channel).City could not purchase radios without a grant, but additions to the website are do able.
Winter Storm10	Delete	Lack of staff	Install new streamflow and precipitation measuring gauges and develop monitoring and early warning program.
Winter Storm11	Delete	Lack of staff	Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
Winter Storm12	Ongoing		Develop early warning test program partnering with NOAA, City Police, Fire Departments, and Volunteer Fire Department to coordinate tests.
Winter Storm13	Completed		Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.
Winter Storm14	Delete	PGE's decision	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line severe wind or winter ice storm event failure.
Winter Storm15	Ongoing		Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.
<b>Landslide</b>			
Landslide1	Ongoing		Complete a landslide location inventory, identify threatened critical facilities and other buildings and infrastructure.

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Landslide2	Delete	Redundant	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Landslide3	Delete	Bldg. code covers	Develop process to limit future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc). Confirm part of Building code.
Landslide4	Ongoing		Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.
Landslide5	Delete	Redundant	Develop comprehensive geological landslide and rockslide prone area maps.
Landslide6	Delete	Redundant	Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.
Landslide7	Delete	No areas	Identify and seasonally restrict recreational and construction activities in high landslide areas. No requirement.
Landslide8	Delete	Lack of funding	Develop, implement and enforce property development landslide risk assessment procedures to identify potential facility vulnerability.
<b>Wildland Fire</b>			
Wildland Fire1	Ongoing		Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Wildland Fire2	Delete	County	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
Wildland Fire3	Completed	Done	Develop Community Wildland Fire Protection Plans for all at-risk communities.
Wildland Fire4	Ongoing		Provide real-time internet access and interagency cooperation to decrease wildland fire warning times.
Wildland Fire5	Delete	Fire District	Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
Wildland Fire6	Delete	Fire District	Promote FireWise building siting, design, and construction materials.
Wildland Fire7	Delete	Fire District	Retrofit structures with FireWise building design materials.
Wildland Fire8	Delete	County or Fire District AOR	Develop FireWise Public Service Announcements (PSA).
Wildland Fire9	Delete	Fire district	Provide wildland fire information in an easily distributed format for all residents.
Wildland Fire10	Ongoing		Schedule and perform government facility "fire drills" at least twice per year.

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Wildland Fire11	Delete	Fire district AOR	Conduct residential audits for wildland and building fire hazard identification then develop an outreach program to convey the findings.
Wildland Fire12	Delete	DEQ & Fire District AOR	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.
Wildland Fire13	Delete	No high risk areas	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
Wildland Fire14	Deferred	Lack of staff	Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.
Wildland Fire15	Delete	Rural not city	Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
<b>Earthquake</b>			
Earthquake1	Ongoing		Supplement State Seismic Needs Analysis data (schools, fire, law enforcement). Complete inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.
Earthquake2	Deferred	Lack of staff	Identify high seismic hazard areas; develop a wood-frame residential building inventory and an outreach program to educate population concerning facilities particularly vulnerable to earthquake damage, such as pre-1940s homes and homes with cripple wall foundations.
Earthquake3	Ongoing		Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Earthquake4	Deferred	Lack of funding	Retrofit important public facilities with significant seismic vulnerabilities, such as unreinforced masonry construction.
Earthquake5	Deferred	Lack of funding	Retrofit bridges that are not seismically adequate for lifeline transportation routes.
Earthquake6	Completed		Update existing (or adopt the most current) Uniform Building Code
Earthquake7	Completed		Implement and enforce the Uniform, International, and State Building Codes.
Earthquake8	Completed		Inspect and/or certify all new construction.
Earthquake9	Ongoing		Develop public outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.
Earthquake 10	Deferred	Lack of staff	Develop outreach program to educate population concerning household, business, and public facility mitigation measures. For example, staff public information tables at fairs, safety events, and festivals.
Earthquake 11	Delete	Redundant	Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
Earthquake 12	Deferred	Lack of staff & funding	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current Building Codes.
Earthquake 13	Deferred	Lack of staff & funding	Identify and prioritize a list of critical facilities with unreinforced masonry problems including non-structural projects such as brick chimney bracing or replacement, water heater bracing, and anchoring, etc.

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**Table 7.9-12. City of Yamhill Mitigation Actions Considered**

<b>Hazard</b>	<b>Status</b>	<b>Comment</b>	<b>Description</b>
Earthquake 14	Deferred	Lack of staff & funding	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
Earthquake 15	Deferred	Lack of staff & funding	Develop outreach program for educating private facilities concerning alternative or emergency power source acquisition to enable them to deliver food, fuel, and medical services during disaster emergency response and recovery efforts.
Earthquake 16	Deleted	Redundant	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
Earthquake 17	Ongoing		Develop partnerships to mitigate hazards that result in jurisdictional facility lifeline or emergency transportation route closures.
<b>Wind</b>			
Wind1	Completed		Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)
Wind2	Deleted	Lack of funding	Identify and prioritize critical facilities' overhead utilities that could be placed underground to reduce power disruption from wind storm / tree blow down damage.
Wind3	Completed		Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.
Wind4	Completed		Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load power line failure during severe wind or winter ice storm events.
Wind5	Delete	Lack of funding	Develop prioritized location list to construct safe rooms to provide tornado and severe wind shelters for public and private use. Projects must meet requirements in FEMA 320 and FEMA 374.
<b>Drought</b>			
Drought 1	New		Develop Water conservation plan for drought emergency
Drought2	Ongoing		Promote outreach programs that address water conservation programs.
Drought3	Delete	No crops within city	Develop outreach agricultural programs that promote reducing topsoil loss during drought conditions and to encourage soil moisture level monitoring to help minimize crop loss.
Drought4	Delete	Lack of staff and funding	Develop educational programs and initiatives related to water conservation and irrigation during drought periods.

## **EVALUATING AND PRIORITIZING MITIGATION ACTIONS**

The following section defines mitigation action evaluation and implementation as stipulated in DMA 2000 and its implementing regulations.

- **DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions**

- **Implementation of Mitigation Actions**

- **Requirement: §201.6(c)(3)(iii):** The mitigation strategy shall include an action plan, describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

- **Element**

- C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?

- Source: FEMA, March 2013.

The Steering Committee met to review, evaluate, and prioritize each of the mitigation actions to determine which considered actions would be included in the Mitigation Action Plan. The Committee then coordinated activities to determine the responsible agency and potential funding sources. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities.

Members of the City of Yamhill's Steering Committee took part in an exercise during the April 9, 2014 countywide MHMP in which they identified the most critical assets and vulnerabilities among those identified in the 2009 vulnerability analysis to assist in the prioritization of mitigation actions. When planning for specific hazard mitigation projects begins the Steering Committee will use the appropriate Benefit-Cost Analysis tool to make decisions about project details. Information on Benefit-Cost Analysis and tools can be found in Appendix F.

Upon review, the Steering Committee assigned a high priority ranking to actions best fulfilling the goals of the MHMP and are appropriate and feasible for the city and responsible entities to implement during the 5-year lifespan of this version of the MHMP. As such, the Steering Committee determined only the existing and new mitigation actions receiving a high priority ranking would be included in the Mitigation Action Plan. The following worksheets depict the City of Yamhill's highest priority mitigation actions.



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**MITIGATION GOALS AND ACTIONS PRIORITIZED & ASSIGNED**

The City of Yamhill reviewed the Yamhill County goals and determined they suit the City's needs and subsequently adopted the Goals in Table 7.9-13 for the current planning period.

Table 7.9-13 City of Yamhill Mitigation Goals	
Goal Number	Goal Description
1	EMERGENCY OPERATIONS <i>Goal Statement:</i> Coordinate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures and with various other agencies, as appropriate.
2	EDUCATION AND OUTREACH <i>Goal Statement:</i> Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
3	PARTNERSHIPS <i>Goal Statement:</i> Develop effective partnerships with public and private sector organizations and significant agencies and businesses for future natural hazard mitigation efforts. <i>Goal Statement:</i> Coordinate natural hazard mitigation actions between the County and local jurisdictions to create more cohesive and effective hazard mitigation efforts.
4	PREVENTIVE <i>Goal Statement:</i> Develop and implement activities to protect human life, commerce, and property from natural hazards. <i>Goal Statement:</i>
5	NATURAL RESOURCES UTILIZATION <i>Goal Statement:</i> Link natural resources management, land use planning, and watershed planning with natural hazard mitigation activities to protect natural systems and allow them to serve natural hazard mitigation functions.
6	IMPLEMENTATION <i>Goal Statement:</i> Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill.
7	DEVELOPMENT <i>Goal Statement:</i> Appropriately apply development standards that consider the potential impacts of natural hazards.
8	DOCUMENTATION <i>Goal Statement:</i> Document and evaluate progress in achieving hazard mitigation strategies and action items.

## **IMPLEMENTING A MITIGATION ACTION PLAN**

The following section defines the mitigation action identification process for each participating jurisdiction as stipulated in DMA 2000 and its implementing regulations.

- **DMA 2000 Requirements: Mitigation Strategy-Identification of Multi-Jurisdictional Mitigation Actions**
  - **Identification of Multi-Jurisdictional Mitigation Actions**
    - **Requirement §201.6(c)(3)(iv):** For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
  - **Element**
    - C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?
  - **Source:** FEMA, March 2013.

## **ACTION ITEM WORKSHEETS**

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding.

### ***Proposed Action Title***

Each action item includes a brief description of the proposed action.

### ***Alignment With Plan Goals***

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

### ***Alignment with Existing Plans / Policies***

Identify any existing community plans and policies where the action item can be incorporated. Incorporating the mitigation action into existing plans and policies, such as comprehensive plans, will increase the likelihood that it will be implemented.

### ***Rationale or Key Issues Addressed***

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section II and the Hazard Annexes.

### ***Implementation through Existing Programs***

For each action item, the form asks for some ideas for implementation, which serve as the starting point for taking action. This information offers a transition from theory to practice. Ideas for implementation could include: (1) collaboration with relevant organizations, (2) alignment with the community priority areas, and (3) applications to new grant programs.

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as: collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure. When an action is implemented, more work will probably be needed to determine the exact course of action.

The Yamhill County MHMP includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Yamhill County and the participating cities currently address statewide planning goals and legislative requirements through their comprehensive land use plans, capital improvements plans, mandated standards and building codes. To the extent possible, the jurisdictions will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Yamhill County MHMP's recommendations are consistent with the goals and objectives of the existing plans and policies. Where possible, Yamhill County and the participating cities will implement the NHMP's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs. Implementing the MHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

### ***Coordinating Organization:***

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

### ***Internal and External Partners:***

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

## **Jurisdictional Addenda City of Yamhill**

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Internal partner organizations are departments within the county or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

### ***Potential Funding Sources***

Where possible, identify potential funding sources for the action item. Example funding sources can include: the federal Pre-Disaster Mitigation and Flood Mitigation Assistance Programs; state funding sources such as the Oregon Seismic Rehabilitation Grant Program; or local funding sources such as capital improvement or general funds. An action item may also have multiple funding sources.

### ***Estimated Cost***

Where possible, an estimate of the cost for implementing the action item is included.

### ***Timeline***

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to three years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement. *Ongoing* action items signify that work has begun and will either exist over an indefinite timeline, or an extended timeline.

### ***Status***

As action items are implemented or new ones are created during the plan maintenance process, it is important to indicate the status of the action item—whether it is new, ongoing, deferred or complete. Documenting the status of the action will make reviewing and updating mitigation plan easier during the plan's five-year update, and can be used as a benchmark for progress. *Deferred* action items have yet to see any significant work begin on the particular action.

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Develop Water conservation plan for drought emergency		<i>Aligns with Education and outreach goal</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Emergency Operations Plan. – drought City Water Master Plan/ Capital Improvement Plan			
<b>Rationale for Proposed Action Item:</b>			
Timely response for action Enforcement of water restrictions			
<b>Ideas for Implementation:</b>			
Education Media? Voluntary? Restrictions or mandatory			
<b>Coordinating Organization:</b>		City Public Works	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City Admin/City Public Works		Yamhill County	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General Fund		TBD	<b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	Jay Disbrow		
<b>Action Item Status:</b>	New		

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Coordinate installation of main power transfer switches		<i>Aligns with Partnership Goals</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Possibly with Emergency Operations Plan. (plan to review)			
<b>Rationale for Proposed Action Item:</b>			
Supply power to critical facilities – I.E. shelters, food storage, gas stations & service facilities, schools			
<b>Ideas for Implementation:</b>			
Purchase power transfer switches as funds become available – identify & prioritize the most critical location			
<b>Coordinating Organization:</b>		Yamhill/Carlton Disaster Preparedness Group	
<b>Internal Partners:</b>		<b>External Partners:</b>	
City Admin/City Public Works		Portland General Electric/ Business Owners	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
Public Fundraising/City Funds Y/C D.P. 6		N/A	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>		Jay Disbrow	
<b>Action Item Status:</b>		New	

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Develop snow removal plan		<i>Aligns with Emergency Operations Goal/ Implementation Goal/ Outreach and Education goal</i>	
<b>Alignment with Existing Plans/Policies:</b>			
Emergency Operations Plan. Transportation Plan			
<b>Rationale for Proposed Action Item:</b>			
Timely- removal of snow, to clear street. And side walks,			
<b>Ideas for Implementation:</b>			
Develop plan to include: Move with equipment providers Locations for snow storage Notifications and alerts Parking restrictions (snow removal routes)  Elderly – vulnerable Population			
<b>Coordinating Organization:</b>			
<b>Internal Partners:</b>		<b>External Partners:</b>	
Public Works /City Administration Business & residents		Oregon Department of Transportation. County & Equipment owners	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General fund; street fund		TBD	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>	Jay Disbrow		
<b>Action Item Status:</b>	New		

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<b>Proposed Action Item:</b>		<b>Alignment with Plan Goals:</b>	
Clean flood prone waterways		Aligns with Emergency Operations. Partners. Outreach and Implementation Goals.	
<b>Alignment with Existing Plans/Policies:</b>			
Emergency Operations stormwater master plan			
<b>Rationale for Proposed Action Item:</b>			
Clean flood prone waterways to reduce impact of high storm water run-off			
<b>Ideas for Implementation:</b>			
Develop a plan Solicit input Affect property owners – on board Get ODOT & county on board			
<b>Coordinating Organization:</b>		Yamhill Public Works	
<b>Internal Partners:</b>		<b>External Partners:</b>	
PW – Residents, volunteers		County, ODOT	
<b>Potential Funding Sources:</b>		<b>Estimated cost:</b>	<b>Timeline (Circle One):</b>
General fund; county		Low/TBD	Ongoing <b>Immediate (1-3 years)</b> Long term (4+ years)
<b>Form Submitted by:</b>			
<b>Action Item Status:</b>			



### 8 PLAN MAINTENANCE

This section describes a formal plan maintenance process to ensure that the NHMP remains an active and relevant document. It includes an explanation of how Yamhill County and the Cities Steering Committees intend to organize their efforts to ensure that improvements and revisions to the NHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail below:

- Monitoring, evaluating, and updating the NHMP
- Implementation through existing planning mechanisms
- Continued public involvement

#### 8.1 MONITORING, EVALUATING, AND UPDATING THE NHMP

The requirements for monitoring, evaluating, and updating the NHMP are described below.

##### DMA 2000 Requirements: Plan Maintenance Process - Monitoring, Evaluating, and Updating the Plan

###### Monitoring, Evaluating and Updating the Plan

Requirement §201.6(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

###### Element

- A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)?

Source: FEMA, March 2013.

The NHMP was prepared as a collaborative effort among county and city staff and each jurisdiction's Steering Committee. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the County will use a county-wide steering committee, composed of city and county officials, to monitor, evaluate, and update the NHMP. Each participating jurisdiction will be responsible for implementing the county or city-specific Mitigation Action Plan. The Yamhill County Emergency Manager will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate, and update the NHMP.

Each year the Yamhill County Emergency Preparedness Council (EPC) will dedicate its July and January meetings to the topic of natural hazard mitigation planning. Members of the countywide steering committee will attend these meetings. During the January meetings, agenda items will include funding opportunities for mitigation projects, project updates and opportunities for cross-jurisdictional coordination. In July the committee will discuss action item progress, plan integration process and updates to the county's hazard history based on events in the most recent twelve-month period.

The Yamhill County Emergency manager will contact each jurisdiction's Steering Committee leader to initiate an annual review one month prior to the July EPC meeting. The findings from these reviews will be presented at the July Steering Committee meeting. As shown in Appendix G, the Annual Review Worksheet will provide the basis for possible changes to the overall NHMP Mitigation Plan and each jurisdiction-specific Mitigation Action Plan by refocusing on

## Plan Maintenance

new or more threatening hazards, adjusting to changes to, or increases in, resource allocations, and engaging additional support for the NHMP implementation. Content from these worksheets may also be moved to an online survey platform but the intention of the review worksheets will remain.

The Annual Review will also include an evaluation of the following:

- Participation of each jurisdiction and others in the NHMP implementation
- Notable changes in the County's risk to natural hazards
- Impacts of land development activities and related programs on hazard mitigation
- Progress made with the Mitigation Action Plan's action items (for each jurisdiction) (identify problems and suggest improvements as necessary)
- The adequacy of available resources to enable NHMP implementation

Each participating jurisdiction will submit a Progress Report (Appendix G) to the Steering Committee. The Progress Report may be translated to an online survey platform but the intention of the document will remain in the survey format. The report will include the current status of the Mitigation Action Plan's mitigation projects, including any changes made to the projects, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has achieved the appropriate goals identified in the plan.

In addition to the annual review, the Steering Committee will update the NHMP every five years. To ensure that this update occurs, in the third year following adoption of the NHMP, the Steering Committees will undertake the following activities:

- Submit a request for eligible grant-funding for the next NHMP update from the State of Oregon Division of Emergency Management.
- Encourage the Cities of Carlton and McMinnville to join in the update process.
- Review FEMA NHMP update requirements for the new planning cycle.
- Thoroughly analyze and update the risk of natural hazards countywide.
- Provide a copy of the County and its participating jurisdictions' prior and current years annual reviews.
- Complete a detailed mitigation strategy review and revision.
- Update the Mitigation Action Plan for all participating jurisdictions identifying the status of the currently identified actions and adding newly considered, prioritized, and assigned actions.
- Prepare a new draft NHMP and submit it to the appropriate governing body for review.
- Submit an updated NHMP to the Oregon Division of Emergency Management and FEMA for review.
- Present NHMP with FEMA's "Conditional Approval" to the County Board and City Councils for adoption.

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- Return a copy of the finalized NHMP with adoption resolutions from all participating jurisdictions to FEMA to finalize FEMA's approval.

### 8.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The requirements for implementation through existing planning mechanisms, as stipulated in the DMA 2000 and its implementing regulations, are described below.

#### DMA 2000 Requirements: Plan Maintenance Process - Incorporation into Existing Planning Mechanisms

##### Incorporation into Existing Planning Mechanisms

**Requirement §201.6(c)(4)(ii):** The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

##### Element

- C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate?

Source: FEMA, March 2013.

Existing programs continue to address statewide planning goals and legislative requirements. The County's comprehensive land use plan, capital improvement plan, mandated standards and building codes currently address identified mitigation initiatives and code compliance requirements. The County strives to incorporate mitigation actions into existing programs and procedures as the opportunity arises.

Table 3 in each of the jurisdiction-specific appendices identifies the local planning mechanisms and regulatory tools available for incorporating the mitigation requirements of the mitigation plan.

The Steering Committees, after NHMP adoption, will ensure the NHMP and each jurisdiction's Mitigation Action Plan is incorporated into existing planning mechanisms. Each member will achieve this incorporation by undertaking the following activities:

- Conduct a review of the community-specific regulatory tools to assess the schedule for integration of the mitigation strategy. These regulatory tools are identified in each capability assessment presented in Section 7.
- Work with pertinent community departments and agencies to increase NHMP awareness and provide assistance in integrating the mitigation strategy into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.

### 8.3 CONTINUED PUBLIC INVOLVEMENT

The requirements for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations, are described below.

#### DMA 2000 Requirements: Plan Maintenance Process - Continued Public Involvement

##### Continued Public Involvement

**Requirement §201.6(c)(4)(iii):** The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

##### Element

- A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process?

Source: FEMA, March 2013.

Yamhill County and each of the participating jurisdictions within the County are dedicated to involving the public directly in the continual reshaping and updating of the NHMP. Electronic and hard copies of the NHMP will be provided to the Yamhill County Emergency Manager and each City. In addition, a downloadable copy of the NHMP will be posted on the County website with any proposed changes. This site will also contain an e-mail address and phone number to which people can direct their comments or concerns.

The Yamhill County Emergency Manager and each Steering Committee will also identify opportunities to raise community awareness about the NHMP and the hazards that affect the participating jurisdictions. This effort could include attendance and provision of materials at County, city, and school-sponsored events, through Red Cross venues, and other Yamhill County outreach programs, and public mailings. Any public comments received regarding the NHMP will be collected by the Yamhill County Emergency Manager, included in the annual report, and considered during future NHMP updates.

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